



Maricopa County Air Quality Department

2005 Air Monitoring Network Review

May 2006

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Acknowledgements

The Maricopa County Air Monitoring Division maintains more than twenty ambient air monitoring sites throughout Maricopa County. There have been several challenges this year including the implementation of new sites and new monitors. Two new technicians were hired this year (Carl Harper and Charles Miller), as well as a new equipment coordinator (Daniel Fields) and a new data coordinator (Ronald Pope). I would especially like to thank all of the air monitoring staff for the excellent job they did in maintaining Maricopa County's air monitoring network. They are Larry Seals, Del Hawkins, Gary Ensminger, Dan Fields, Ronald Pope, Tom Shorb, Bill Searle, Dale Foster, Chris Hernandez, Hugh Tom, Charles Miller, Carl Harper, and Robert Dyer.

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Table of Contents

ACKNOWLEDGEMENTS	II
ABSTRACT	1
DEFINITION OF TERMS	2
CRITERIA POLLUTANT INFORMATION	3
<u>ABSTRACT OF POLLUTANTS</u>	3
<u>CAUSES AND CHARACTERISTICS OF POLLUTANTS</u>	3
Carbon Monoxide:	3
Lead:	3
Nitrogen Dioxide:	4
Ozone:	4
Particulate Matter:	4
Sulfur Dioxide:	4
<u>NATIONAL AMBIENT AIR QUALITY STANDARDS</u>	5
<u>ABSTRACT OF MCAQD POLLUTION MONITORING STRATEGIES</u>	5
NETWORK DESIGN	6
<u>PURPOSE AND OBJECTIVE OF THE NETWORK</u>	6
<u>OVERVIEW OF THE MCAQD NETWORK</u>	7
2005 SUMMARY OF NETWORK RESULTS AND REQUIRED INFORMATION	12
<u>DATA COMPLETENESS</u>	12
<u>2005 CONCENTRATION RANGES</u>	12
<u>CRITERIA POLLUTANT SUMMARY</u>	15
Carbon Monoxide (CO)	15
Ozone (O ₃)	15
Particulate Matter (PM ₁₀)	18
Particulate Matter (PM _{2.5})	19
Nitrogen Dioxide (NO ₂)	20
Sulfur Dioxide (SO ₂)	20
<u>2005 NAAQS EXCEEDANCE AND VIOLATION SUMMARY</u>	21
<u>2005 VIOLATIONS OF THE 24-HOUR PM₁₀ STANDARD</u>	23
<u>2005 VIOLATIONS OF THE ANNUAL PARTICULATE STANDARD</u>	24
<u>POLLUTION TRENDS</u>	25
Carbon Monoxide	25
Nitrogen Dioxide	25
Ozone	26
Particulates	26
Sulfur Dioxide	27
SPECIAL PROJECTS AND NETWORK CHANGES	28
<u>SEASONAL MONITORS</u>	28
<u>THE CONSIDERATION OF ADDITIONAL SITES/MONITORS</u>	28
<u>NEW SITES</u>	28
<u>CLOSED SITES/MONITORS</u>	29
<u>OTHER NETWORK CHANGES/SPECIAL PROJECTS/COMMENTS</u>	29
<u>CONVERTING TO CONTINUOUS PARTICULATE MONITORING</u>	29
ADDITIONAL COMMENTS	30
<u>EPA OZONE MAPPING</u>	30
<u>MARICOPA COUNTY'S INTERACTIVE POLLUTION MAP</u>	31
REFERENCES	32

APPENDIX	34
MONITORING SITE DETAILS (PHOTOS AND SPECIFIC INFORMATION)	34
MARICOPA COUNTY BLUE POINT AIR MONITORING SITE	35
MARICOPA COUNTY BUCKEYE AIR MONITORING SITE	36
MARICOPA COUNTY CAVE CREEK AIR MONITORING SITE	37
MARICOPA COUNTY CENTRAL PHOENIX AIR MONITORING SITE	38
MARICOPA COUNTY CHANDLER AIR MONITORING SITE	39
MARICOPA COUNTY DURANGO COMPLEX AIR MONITORING SITE	40
MARICOPA COUNTY DYSART AIR MONITORING SITE	41
MARICOPA COUNTY FALCON FIELD AIR MONITORING SITE	42
MARICOPA COUNTY FOUNTAIN HILLS AIR MONITORING SITE	43
MARICOPA COUNTY GLENDALE AIR MONITORING SITE	44
MARICOPA COUNTY GREENWOOD AIR MONITORING SITE	45
MARICOPA COUNTY HIGLEY AIR MONITORING SITE	46
MARICOPA COUNTY HUMBOLDT MOUNTAIN AIR MONITORING SITE	47
MARICOPA COUNTY MESA AIR MONITORING SITE	48
MARICOPA COUNTY NORTH PHOENIX AIR MONITORING SITE	49
MARICOPA COUNTY PINNACLE PEAK AIR MONITORING SITE	50
MARICOPA COUNTY RIO VERDE AIR MONITORING SITE	51
MARICOPA COUNTY SOUTH PHOENIX AIR MONITORING SITE	52
MARICOPA COUNTY SOUTH SCOTTSDALE AIR MONITORING SITE	53
MARICOPA COUNTY TEMPE AIR MONITORING SITE	54
MARICOPA COUNTY WEST CHANDLER AIR MONITORING SITE	55
MARICOPA COUNTY WEST 43 RD AVENUE AIR MONITORING SITE	56
MARICOPA COUNTY WEST INDIAN SCHOOL ROAD AIR MONITORING SITE	57
MARICOPA COUNTY WEST PHOENIX AIR MONITORING SITE	58

List of Tables

Table 1. National Ambient Air Quality Standards	5
Table 2. Site Monitoring Objectives	6
Table 3. Spatial Measurement Scales	6
Table 4. Maricopa County Ambient Air Monitoring Sites for 2005	8
Table 5. Criteria Pollutants Monitored, by Site and Network	8
Table 6. Site Location	9
Table 7. Site Instrument Setup	11
Table 8. 2005 Criteria Pollutant Data Completeness.....	12
Table 9. Distribution of 8-hour Carbon Monoxide Concentrations.....	13
Table 10. Distribution of 1-hour Ozone Concentrations	13
Table 11. Distribution of 1-hour Nitrogen Dioxide Concentrations.....	14
Table 12. Distribution of 24-hr Sulfur Dioxide Concentrations.....	14
Table 13. Distribution of 24-hour PM ₁₀ Concentrations	14
Table 14. 2005 1-hour and 8-hour Average Carbon Monoxide Summary	15
Table 15. 2005 One Hour Average Ozone Summary	16
Table 16. 2005 8-hr Average Ozone Summary	17
Table 17. 3 Year Average of 8-Hour Ozone	17
Table 18. 2005 PM ₁₀ Summary	18
Table 19. 2005 PM _{2.5} Summary	19
Table 20. 2005 Continuous PM _{2.5} Data Summary.....	19
Table 21. 2005 Nitrogen Dioxide Summary	20
Table 22. 2005 Sulfur Dioxide Summary.....	20
Table 23. 2005 NAAQS Exceedances and Violations Summary	21
Table 24. 2005 Ozone 8-hour Average Exceedance Details	21
Table 25. 2005 PM ₁₀ 24-hour Average Exceedance Details	22
Table 26. 2005 PM ₁₀ Annual Average Exceedance Details	22
Table 27. Violations of the 24-hr PM ₁₀ Standard	23
Table 28. Violations of the Annual PM ₁₀ Standard	24
Table 29. Seasonal Monitors	28
Table 30. Air Quality Index	30

ABSTRACT

This 2005 Annual Air Monitoring Network Review is being submitted by the Maricopa County Air Quality Department¹ (MCAQD) to the United States Environmental Protection Agency (US EPA) Region 9. The network review evaluates the adequacy of the ambient air monitoring network with respect to the monitoring objectives and spatial scales. This annual assessment is required by 40 CFR Part 58, Appendix F. The National Air Monitoring Stations (NAMS) and State and Local Air Monitoring Stations (SLAMS) are evaluated for their location and adequacy. Network changes, special projects, and 3-year data summaries are also included in the review. This network review has the secondary purpose of informing the public of the criteria air pollutants that can affect their health, how the MCAQD monitors these criteria pollutants, and what the actual readings are so that our citizens can make informed decisions regarding their lifestyles.

¹ The functions of the former Air Quality Division of the Maricopa County Environmental Services Department (MCESD) were transferred to the newly-created Air Quality Department in November 2004.

DEFINITION OF TERMS

ADEQ:	Arizona Department of Environmental Quality.
AQS:	Environmental Protection Agency's Air Quality System
CFR:	Code of Federal Regulations.
Class I:	Federally designated park or wilderness area with mandated visibility protection.
CO:	Carbon monoxide.
Criteria	
Pollutants:	Six pollutants (CO, lead, NO ₂ , O ₃ , Particulates, and SO ₂) that have NAAQS established by the US EPA.
Delta T:	Difference between two levels of temperature measurements. Delta T is measured in the MCAQD network at 2 and 10 meters.
EPA:	U. S. Environmental Protection Agency.
FDMS-	
TEOM:	Filter Dynamics Measurement System-Tapered Element Oscillating Microbalance. A continuous particulate measuring instrument used by MCAQD to measure PM _{2.5} .
HAPs:	Hazardous air pollutants. An air-born chemical that has been listed in the federal Clean Air Act and has an associated standard or process requirement determined for it.
MCAQD:	Maricopa County Air Quality Department.
µg/m³:	Microgram per cubic meter.
NAAQS:	National Ambient Air Quality Standards. A health and welfare-based standard that is set by the US EPA to qualify allowable levels of criteria pollutants.
NAMS:	National Air Monitoring Station. The NAMS (1,080 stations nationwide) are a subset of the SLAMS network with emphasis being given to urban and multi-source areas. In effect, they are key sites under SLAMS, with emphasis on areas of maximum concentrations and high population density.
NO₂:	Nitrogen dioxide.
NO_x:	Sum of nitrogen oxide and NO ₂ .
O₃:	Ozone.
Pb:	Lead.
PM:	Particulate matter. Material suspended in the air in the form of minute solid particles or liquid droplets.
PM_{2.5}:	Particulate matter of 2.5 Microns in diameter or smaller
PM₁₀:	Particulate matter of 10 Microns in diameter or smaller.
PPB:	Parts per billion.
PPM:	Parts per million.
SIP:	State Implementation Plan. SIPs are a collection of state and local regulations and plans to achieve healthy air quality under the Clean Air Act.
SLAMS:	State and Local Air Monitoring Station. The SLAMS consist of a network of ~ 4,000 monitoring stations nationwide whose size and distribution is largely determined by the needs of State and local air pollution control agencies to meet their respective State implementation plan (SIP) requirements.
SO₂:	Sulfur dioxide.
SPM:	Special purpose monitor. Special Purpose Monitoring Stations provide for special studies needed by the State and local agencies to support State implementation plans and other air program activities. The SPMs are not permanently established and can be adjusted easily to accommodate changing needs and priorities.
SSI:	Size Selective Inlet. SSI High Volume Samplers are filter-based instruments used by MCAQD to measure PM ₁₀ .
TEOM:	Tapered Element Oscillating Microbalance. A continuous particulate measuring instrument used by MCAQD to measure particulate matter.
TSP:	Total suspended particulate.
VOC:	Volatile organic compounds.

CRITERIA POLLUTANT INFORMATION

Abstract of Pollutants

Certain air pollutants, called “criteria air pollutants,” are common throughout the United States. These pollutants can cause health problems, pollute the environment, and cause property damage. These criteria pollutants are so named since the US EPA has regulations, called the National Ambient Air Quality Standards (NAAQS), on allowable levels of these substances using health-based criteria. One set of limits, called “primary standards”, protect health, while another set of “secondary” standards, are designed to protect property and the environment. The US EPA names the following pollutants as criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulates (PM₁₀ & PM_{2.5}), and sulfur dioxide (SO₂). MCAQD operates monitors for the following criteria pollutants: carbon monoxide, ozone, particulates, nitrogen dioxide, and sulfur dioxide. Since levels of lead have been consistently below national levels, MCAQD has been allowed to stop monitoring for lead.

Causes and Characteristics of Pollutants

Carbon Monoxide:

CO is the most widely distributed and most commonly occurring air pollutant. Total emissions of CO to the atmosphere exceed all other pollutants combined, on a weight basis. Fortunately, CO does not persist in the atmosphere, but is quickly converted to carbon dioxide (CO₂). CO can reach dangerous levels in localized areas or hotspots such as heavily traveled intersections or city streets. In addition, CO has been implicated in ozone formation. Most people are familiar with CO and are aware that automobiles produce this deadly odorless and colorless gas. In Maricopa County, more than 70% of all anthropogenic CO comes from motor vehicle emissions. In fact, this gas is produced almost anytime something is burned. All substances that are living (plants, animals) or that were once living (wood, coal, oil, gasoline) are composed of carbon compounds. If these substances are burned in the presence of sufficient oxygen, the carbon is converted to CO₂ gas. If, as is often the case, not enough oxygen is present, carbon monoxide gas is produced.

Carbon monoxide’s danger lies in the extremely strong affinity that hemoglobin has for it. Hemoglobin, the special oxygen-transporting material in the red blood cell, has approximately 200 times stronger affinity for CO than for oxygen. Therefore, if both CO and O₂ are present the bonding between the CO and hemoglobin will prevent the O₂ from exchanging with a person’s body. This puts a heavy burden on people with heart disease and can aggravate angina, but even healthy people can suffer from harmful side effects from CO. In 2005 Maricopa County achieved its ninth consecutive year of compliance with the eight-hour CO standard.

Lead:

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. Due to the phase out of leaded gasoline, metals processing is the major source of lead emissions to the air today. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers. In the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995. Primarily as a result of EPA's regulatory efforts to remove lead from gasoline, levels of lead in the air have decreased by 94 percent between 1980 and 1999.

Since levels of lead have been consistently below national levels, Maricopa County was allowed to discontinue ambient air monitoring for lead in 1997.

Nitrogen Dioxide:

NO₂ belongs to a family of highly reactive gases called nitrogen oxides. These gases are formed when fuel is burned at high temperatures, and are emitted primarily from automobile exhaust and power plants. Exposure to nitrogen dioxide can irritate the lungs and lower resistance to respiratory infections, particularly in people with existing respiratory illness such as asthma.

Ozone:

O₃ is a naturally occurring compound in which three oxygen atoms combine together. This is an unstable combination, and ozone is continually going through a natural cycle of being formed and then converting back to the more stable “normal” double oxygen compound (O₂). The cycle occurs fairly rapidly. In the stratosphere (6 miles and more above the earth), naturally occurring ozone has a beneficial effect of screening out harmful ultraviolet light from the sun. However, ground-level ozone is a pollutant and is a component of the regional smog that affects the valley. Ozone is not directly emitted into the air, but rather forms in a complex reaction that involves heat, sunlight, and a “soup” of toxic pollutants, especially volatile organic compounds (VOCs). Some of the most common sources of VOCs are gasoline vapors, chemical solvents, and combustion products of fuels and consumer products. Ozone is created by sunlight acting on nitrates (NO_x) and VOCs from motor vehicles and stationary sources, and can be carried hundreds of miles from their origins. Ozone affects the respiratory system in people and animals, and also affects the growth of plants.

Particulate Matter:

Particulate matter is the term for solid or liquid particles found in the air. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. While some particles are large or dark enough to be seen as soot or smoke, others can only be seen through an electron microscope. In 1987 the EPA replaced the Total Suspended Particulates (TSP) air quality standard with a standard for PM₁₀ (particles measuring ten microns or less). Health research studies have found that PM₁₀ has the ability to reach the lower regions of the respiratory tract, and thus can affect the respiratory system in both humans and animals. Particulates that have high acid levels can cause damage to man-made materials and reduce visibility.

The size of particles is directly linked to their potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. EPA groups particle pollution into two categories:

- "Coarse particles," such as those found near roadways and dusty industries, range in size from 2.5 to 10 microns in diameter.
- "Fine particles," such as those found in smoke and haze, have diameters smaller than 2.5 microns. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.

Sulfur Dioxide:

SO₂ is emitted (in gaseous form) largely from burning high-sulfur coal, oil, and diesel fuel. Because this gas is usually found in association with particulate pollution, as SO₂ is the precursor for fine sulfate particles, separating the health effects of these two pollutants is difficult. Together SO₂ and PM_{2.5} make up a major portion of the pollutant load in many cities, acting separately and in concert to threaten public health. SO₂ contributes to respiratory illness, particularly in children and the elderly, and aggravates existing heart and lung diseases. SO₂ contributes to the formation of acid rain, and it contributes to the formation of atmospheric particles that cause visibility impairment, most noticeably in national parks. SO₂ and the pollutants formed from SO₂, such as sulfate particles, can be transported over long distances and deposited far from the point of origin. This means that problems with SO₂ are not confined to areas where it is emitted.

National Ambient Air Quality Standards

The EPA Office of Air Quality Planning and Standards (OAQPS) manages programs to improve air quality in areas where the current quality is unacceptable and to prevent deterioration in areas where the air is relatively free of contamination. To accomplish this task, OAQPS establishes the National Ambient Air Quality Standard (NAAQS) for each of the criteria pollutants.

There are two types of standards. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Because different pollutants have different effects, the NAAQS are also different. Some pollutants have standards for both long-term and short-term averaging times. The short-term standards are designed to protect against acute, or short-term, health effects, while the long-term standards are established to protect against chronic health effects. Table 1 lists the NAAQS for six criteria pollutants.

Table 1. National Ambient Air Quality Standards

Pollutant	Primary Standards	Averaging Times	Secondary Standard
Carbon Monoxide	9 ppm	8-hour ¹	None
	35 ppm	1-hour ¹	None
Lead	1.5 µg/m ³	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm	Annual (Arithmetic Mean)	Same as Primary
PM ₁₀	50 µg/m ³	Annual ² (Arithmetic. Mean)	Same as Primary
	150 µg /m ³	24-hour ¹	
PM _{2.5}	15 µg/m ³	Annual ³ (Arithmetic Mean)	Same as Primary
	65 µg/m ³	24-hour ⁴	
Ozone	0.08 ppm	8-hour ⁵	Same as Primary
Sulfur Oxides	0.03 ppm	Annual (Arithmetic Mean)	-----
	0.14 ppm	24-hour ¹	-----
	-----	3-hour ¹	0.5 ppm

¹ Not to be exceeded more than once per year.

² To attain this standard, the three year average of the annual arithmetic mean PM₁₀ concentration at each monitor within an area must not exceed 50 µg/m³.

³ To attain this standard, the 3-year average of the annual arithmetic mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15 µg/m³.

⁴ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m³.

⁵ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

Abstract of MCAQD Pollution Monitoring Strategies

The MCAQD monitors for these criteria pollutants by maintaining twenty-four ambient air-monitoring sites throughout Maricopa County. The dates that the sites were established range from 1961 (Central Phoenix) to 2004 (Buckeye). Land use patterns around these sites vary from heavy populated urban areas to sparsely populated rural settings. Site elevations range from the Salt River channel to the top of Humboldt Mountain. Not all pollutants are measured at all sites; some sites measure all of the pollutants, while others only measure one or two pollutants.

NETWORK DESIGN

Purpose and Objective of the Network

The purpose of the ambient air monitoring network is to sample air pollution in a variety of settings, assess the health and welfare effects, and assist in determining sources of air pollution. In general, six basic monitoring objectives and five measuring scales are used to determine the network design (see Tables 2 and 3). Additional considerations such as availability of power, accessibility to site, security, geographic location, and fiscal and personnel resources are also addressed in determining the feasibility of the network design.

Table 2. Site Monitoring Objectives

1. Determine highest concentrations expected to occur in the area covered by the network.
2. Determine representative concentrations in areas of high population density.
3. Determine the impact on ambient pollution levels of significant sources or source categories.
4. Determine general background concentration levels.
5. Determine the extent of regional pollutant transport from populated areas, with regards to the secondary standards (such as visibility impairment and effects on vegetation).
6. Determine the welfare-related impacts in more rural and remote areas.

To establish or evaluate a site, one must link its monitoring objectives to the physical location of the site. This can be done by matching the spatial scale, which represents the sample of air around the monitor where pollutant concentrations are reasonably uniform, with the most appropriate monitoring objective. Thus, spatial scale represents the physical dimensions of the air parcel around the monitor, and monitoring objective represents the overall purpose of the monitor. Combining the proper spatial scale with the monitoring objective explains why air monitoring sites are located in particular areas.

Table 3. Spatial Measurement Scales

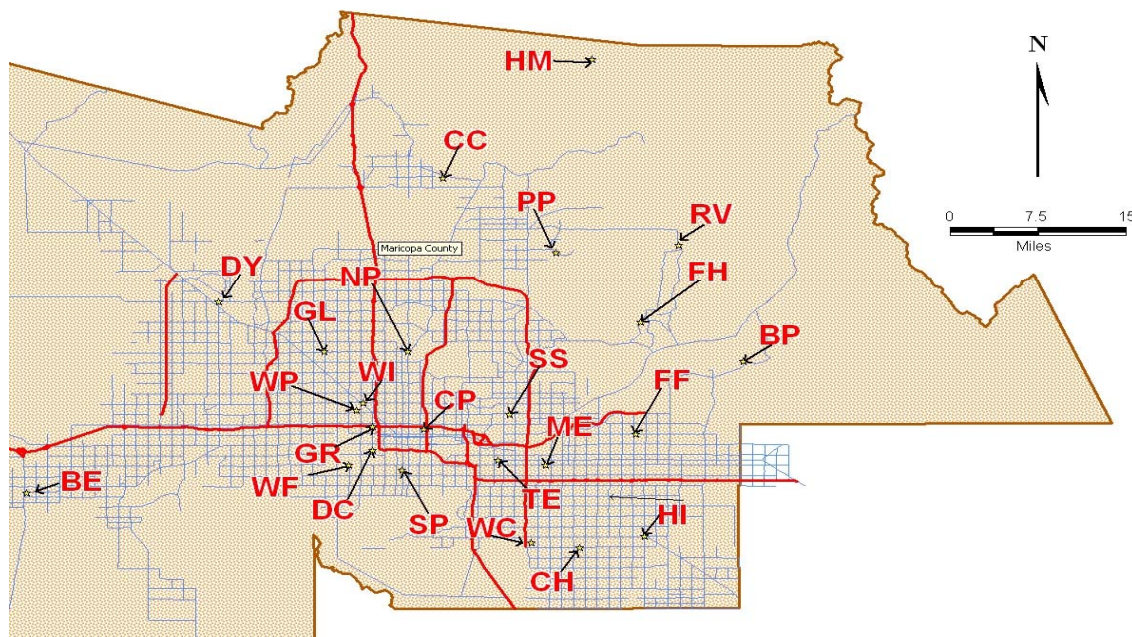
Scale	Defined parameter (radius)
Micro Scale	0 to 100 meters
Middle Scale	100 to 500 meters
Neighborhood Scale	0.5 to 4 kilometers
Urban Scale	4 to 50 kilometers
Regional Scale	10 to 100s of kilometers

Since it is physically and fiscally impossible to monitor air quality in every location, representative samples must be obtained. The optimal locations for obtaining these samples are determined by using the monitoring objectives and the spatial measurement scales described above. For example, there might be numerous locations where the highest concentration of carbon monoxide may occur. Using these principles, only one or two sites will be established to represent all of the high-concentration areas. The same reasoning can be used for different types of pollutants. This does not mean that the number of monitoring sites is fixed. To the contrary, the network must be dynamic enough to maintain a current representative sample of the air quality.

Overview of the MCAQD Network

MCAQD operated a network of 24 monitoring sites in 2005. The following image details the location of these sites and gives the abbreviation symbols used by Maricopa County. Tables 4 and 5, which follow, give the AQS code assigned to each site and details which criteria pollutant is monitored at which site along with the monitor designation, respectively. Tables 6 and 7 give more specific information about the location of the sites and the types and numbers of monitors at each site, respectively.

Maricopa County Air Monitoring Sites - 2005



Site Abbreviation	Site Name
BP	Blue Point
BE	Buckeye
CC	Cave Creek
CP	Central Phoenix
CH	Chandler
DC	Durango Complex
DY	Dysart
FF	Falcon Field
FH	Fountain Hills
GL	Glendale
GR	Greenwood
HI	Higley
HM	Humboldt Mountain
ME	Mesa
NP	North Phoenix
PP	Pinnacle Peak
RV	Rio Verde
SP	South Phoenix
SS	South Scottsdale
TE	Tempe
WC	West Chandler
WF	West 43 rd Avenue
WI	W. Indian School
WP	West Phoenix

Table 4. Maricopa County Ambient Air Monitoring Sites for 2005

Site Name	Site Abbr.	AQS Code
Blue Point	BP	04-013-9702
Buckeye	BE	04-013-4011
Cave Creek	CC	04-013-4008
Chandler	CH	04-013-0021
Central Phoenix	CP	04-013-3002
Durango Complex	DC	04-013-9812
Dysart	DY	04-013-4010
Falcon Field	FF	04-013-1010
Fountain Hills	FH	04-013-9704
Glendale	GL	04-013-2001
Greenwood	GR	04-013-3010
Higley	HI	04-013-4006

Site Name	Site Abbr.	AQS Code
Humboldt Mountain	HM	04-013-9508
Mesa	ME	04-013-1003
North Phoenix	NP	04-013-1004
Pinnacle Peak	PP	04-013-2005
Rio Verde	RV	04-013-9706
South Phoenix	SP	04-013-4003
South Scottsdale	SS	04-013-3003
Tempe	TE	04-013-4005
West Chandler	WC	04-013-4004
West 43 rd Ave.	WF	04-013-4009
W. Indian School Rd.	WI	04-013-0016
West Phoenix	WP	04-013-0019

Table 5. Criteria Pollutants Monitored, by Site and Network

Site	O ₃	CO	PM _{2.5}	PM ₁₀	NO ₂	SO ₂
Blue Point	NAMS					
Buckeye	SLAMS	SLAMS		SLAMS	SLAMS	
Cave Creek	SLAMS					
Chandler				NAMS		
Central Phoenix	NAMS	NAMS		NAMS	NAMS	NAMS
Durango Complex			SLAMS	SLAMS		
Dysart	SLAMS	SLAMS		SLAMS		
Falcon Field	SLAMS					
Fountain Hills	NAMS					
Glendale	SLAMS	SLAMS		NAMS		
Greenwood		SLAMS		SLAMS	SLAMS	
Higley				SLAMS		
Humboldt Mountain	SLAMS					
Mesa		SLAMS	SLAMS	SLAMS		
North Phoenix	SLAMS	SLAMS		SLAMS		
Pinnacle Peak	SLAMS					
Rio Verde	SLAMS					
South Phoenix	SLAMS	SLAMS	SLAMS	SLAMS		
South Scottsdale	SLAMS	SLAMS		NAMS	NAMS	NAMS
Tempe	SPM	SPM				
West Chandler	SLAMS	SLAMS		SLAMS		
West 43rd Ave.				SLAMS		
W. Indian School Rd.		NAMS				
West Phoenix	SLAMS	NAMS	SLAMS	NAMS	SLAMS	

Table 6. Site Location

Site	Latitude	Longitude	Site Location	AQS Code
BP	33° 33' 09.263"	-111° 36' 25.465"	Usery Pass & Bush Highway	04-013-9702
BE	33.36980	-112.62014	MC85 & HWY 85	04-013-4001
CC	33° 49.32'	-112° 1.02'	32nd St. & Carefree Highway	04-013-4008
CH	33° 17' 09.630"	-111° 49' 03.691"	Pecos & McQueen	04-013-0021
CP	33° 27' 29.130"	-112° 02' 28.809"	19th St & Roosevelt	04-013-3002
DC	33° 25' 60"	-112° 07' 12"	27th Ave. & Durango St.	04-013-9812
DY	33.6370	-112.3394	Bell Rd. & Dysart Rd.	04-013-4010
FF	33° 27' 09.371"	-111° 43' 58.462"	McKellips & Greenfield	04-013-1010
FH	33° 36' 39.30"	-111° 43' 31.33"	Palisades & Fountain Hills Blvd.	04-013-9704
GL	33° 34' 09.487"	-112° 11' 26.855"	59th Ave & W. Olive	04-013-2001
GR	33° 27' 38.872"	-112° 07' 00.526"	27th Ave. & Interstate 10	04-013-3010
HI	33° 18.47'	-111° 43.33'	Higley Rd. & Chandler Blvd	04-013-4006
HM	33° 58' 53.255"	-111° 47' 50.478"	Top of Humboldt Mountain	04-013-9508
ME	33° 24' 37.798"	-111° 51' 51.518"	Broadway Rd. & Alma School Rd.	04-013-1003
NP	33° 33' 37.055"	-112° 03' 55.797"	7th Street & Dunlap Avenue	04-013-1004
PP	33° 42' 43.440"	-111° 51' 05.644"	Pima Rd & Pinnacle Peak	04-013-2005
RV	33° 43' 06.418"	-111° 40' 16.142"	Forest Rd & Del Ray Ave.	04-013-9706
SP	33° 24' 12.410"	-112° 04' 23.196"	Central Ave. & Broadway	04-013-4003
SS	33° 28' 46.049"	-111° 54' 59.250"	Scottsdale Rd. & Thomas Rd.	04-013-3003
TE	33° 24.67'	-111° 56.10'	College Ave. & Apache Blvd.	04-013-4005
WC	33° 17.93'	-111° 53.04'	Ellis St. & Frye Rd.	04-013-4004
WF	33° 24.37'	-112° 88.66'	43 rd Ave. & Broadway Rd.	04-013-4009
WI	33° 29' 40.950"	-112° 07' 48.825"	33rd Ave. & Indian School Rd.	04-013-0016
WP	33° 29' 01.280"	-112° 08' 31.463"	39th Ave. & Earll Dr.	04-013-0019

Table 7. Site Instrument Setup
AIR MONITORING NETWORK OPERATIONS

AIR MONITORING NETWORK OPERATIONS																										
Sites	WS/ WD		O3		CO		NOX		SO2	Press	Delta T		Cont. PM ₁₀	Cont. PM _{2.5}	Temp	Rel Hum	Room Temp	Rain	PM _{2.5} Filter	PM ₁₀ Filter	Multi- Gas	Active Instru.				
BP	1	s	1	n											1		1						4			
BE	1	s	1	s*	1	s*	1	s		1			1	s		1	1	1				1	10			
CC	1	s	1	s*											1	1	1						5			
CH	1	s															1			2	n		4			
CP	1	s	1	n	1	n	1	n	1	n	1		1	s		1		1			1	n	1	11		
DC	1	s								1			1	s	1	s	1							5		
DY	1	s	1	s*	1	s*									1	1	1				1	s		7		
FF	1	s	1	s*													1							3		
FH	1	s	1	n						1					1	1	1							6		
GL	1	s	1	s*	1	s*											1				1	n		5		
GR	1	s			1	s	1	s									1	1			1	s	1	7		
HI	1	s								1	1	s	1	s		1								5		
HM			1	s*													1							2		
ME	1	s			1	s*				1					1	1	1		1	s	2	s		9		
NP	1	s	1	s	1	s*				1	1	s			1		1				1	s		8		
PP	1	s	1	s													1							3		
RV			1	s*													1							2		
SP	1	s	1	s	1	s*				1					1		1		1	s	1	n		8		
SS	1	s	1	n	1	s*	1	n	1	n	1				1	1	1				1	n	1	11		
TE	1	sp	1	sp*	1	sp*					1	sp			1		1	1	1					7		
WC	1	s	1	s*	1	s*				1					1	1	1				1	s		8		
WF	1	sp								1	1	sp	2	s		1		1						7		
WI	1	s			1	n											1							3		
WP	1	s	1	s	1	n	1	s		1	1	s	1	s	1	s	1		1	2	s	2	n	1	15	
Active Instr.	22		17		13		5		2		12	5		7		2	16	7	22	2	4		14		5	

n = NAMS

s = SLAMS

sp = SPMS

x = inactive instruments

* = seasonal monitor

Total # of Active Instruments

155

Chart Current as of 12/6/05

Total # of
Active Sites

24

2005 SUMMARY OF NETWORK RESULTS AND REQUIRED INFORMATION

Data Completeness

Before any data set can be considered valid it must first pass a data recovery test that consists of determining the ratio of actual samples to scheduled samples by quarter. This ratio must be greater than 75% for a data set to pass the first validity test. After all validation tests have been passed, the data can be used to determine compliance with the NAAQS.

The following is a summary of the annual data completeness for all criteria pollutants (Table 8).

Table 8. 2005 Criteria Pollutant Data Completeness

	Number of Actual Samples	Number of Scheduled Samples	Data Completeness (Actual/Schedule)
Carbon Monoxide	78465	80832	97.1%
Ozone	113170	116304	97.3%
PM _{2.5} (1 in 3 day)	436	449	97.1%
PM _{2.5} (continuous)	2762	7344	37.6%
PM ₁₀ (1 in 6 day)	661	671	98.5%
PM ₁₀ (continuous)	42921	43800	98.0%
Nitrogen Dioxide	41879	43800	95.6%
Sulfur Dioxide	16870	17520	96.3%
Total	297164	310720	95.6%

Note that the continuous PM_{2.5} monitors did not reach the required 75% data completeness level. This was due to a calibration error that was discovered at the Durango Complex continuous PM_{2.5} monitor. This error caused all 2005 data from that monitor, from July 1 to December 31st, to be invalidated. However, the FDMS-TEOM instrument used for monitoring continuous PM_{2.5} data is not a Federal Reference Method, so the data from this instrument is not used for determining compliance with the NAAQS.

2005 Concentration Ranges

Tables 9 through 13 below present data on the distribution of monitored values for various air pollutants, as required by the 40 CFR Part 58 App. F. Note that 1-hour average ozone concentrations are listed in Table 10 for illustrative purposes only; the 1-hour ozone National Ambient Air Quality Standard is no longer in effect.

Table 9. Distribution of 8-hour Carbon Monoxide Concentrations

Site	Number of 8-hr Average Values (PPM)							
	0 to 4	5 to 8	9 to 12	13 to 16	17 to 20	21 to 24	25 to 28	Greater than 28
Buckeye	4977	0	0	0	0	0	0	0
Central Phoenix	8648	0	0	0	0	0	0	0
Dysart	5063	0	0	0	0	0	0	0
Glendale	4911	0	0	0	0	0	0	0
Greenwood	8669	0	0	0	0	0	0	0
Mesa	4912	0	0	0	0	0	0	0
North Phoenix	5079	0	0	0	0	0	0	0
South Phoenix	5022	0	0	0	0	0	0	0
South Scottsdale	4854	0	0	0	0	0	0	0
Tempe	5064	0	0	0	0	0	0	0
West Chandler	5065	0	0	0	0	0	0	0
W. Indian School	8482	15	0	0	0	0	0	0
West Phoenix	8483	9	0	0	0	0	0	0

Table 10. Distribution of 1-hour Ozone Concentrations

Site	Number of 1-hr Average Values (PPM)							
	0.00 to 0.04	0.05 to 0.08	0.09 to 0.12	0.13 to 0.16	0.17 to 0.20	0.21 to 0.24	0.25 to 0.28	Greater than 0.28
Buckeye	4026	1028	1	0	0	0	0	0
Blue Point	7069	1533	20	0	0	0	0	0
Cave Creek	2257	2777	38	0	0	0	0	0
Central Phoenix	7048	1420	20	0	0	0	0	0
Dysart	3776	1271	0	0	0	0	0	0
Falcon Field	3282	1586	15	0	0	0	0	0
Fountain Hills	5816	2731	52	1	0	0	0	0
Glendale	3475	1569	14	0	0	0	0	0
Humboldt Mt.	800	4004	54	0	0	0	0	0
North Phoenix	6487	2074	61	0	0	0	0	0
Pinnacle Peak	5237	3241	18	0	0	0	0	0
Rio Verde	2651	2339	61	0	0	0	0	0
South Phoenix	6722	1833	16	0	0	0	0	0
South Scottsdale	6598	1847	26	0	0	0	0	0
Tempe	3473	1566	22	0	0	0	0	0
West Chandler	3338	1711	14	0	0	0	0	0
West Phoenix	7026	1124	2	0	0	0	0	0

Table 11. Distribution of 1-hour Nitrogen Dioxide Concentrations

Site	Number of 1-hr Average Values (PPM)							
	0.00 to 0.04	0.05 to 0.08	0.09 to 0.12	0.13 to 0.16	0.17 to 0.20	0.21 to 0.24	0.25 to 0.28	Greater than 0.28
Buckeye	8302	5	0	0	0	0	0	0
Central Phoenix	7370	1118	2	0	0	0	0	0
Greenwood	6531	1922	13	1	0	0	0	0
South Scottsdale	8018	406	0	0	0	0	0	0
West Phoenix	7452	732	7	0	0	0	0	0

Table 12. Distribution of 24-hr Sulfur Dioxide Concentrations

Site	Number of 24-hr Average Values (PPM)							
	0.00 to 0.04	0.05 to 0.08	0.09 to 0.12	0.13 to 0.16	0.17 to 0.20	0.21 to 0.24	0.25 to 0.28	Greater than 0.28
Central Phoenix	8760	0	0	0	0	0	0	0
South Scottsdale	8503	0	0	0	0	0	0	0

Table 13. Distribution of 24-hour PM₁₀ Concentrations

Site	Number of 24-hr Average Values (µg/m ³)							
	0 to 50	51 to 100	101 to 150	151 to 200	201 to 250	251 to 300	301 to 400	Greater than 400
Buckeye	172	173	12	3	0	0	0	0
Central Phoenix (1 in 6 day)	45	12	1	0	0	0	0	0
Central Phoenix (Continuous)	292	59	2	0	0	0	0	0
Chandler	31	25	2	0	0	0	0	0
Durango	128	178	42	12	1	0	0	0
Dysart	57	4	0	0	0	0	0	0
Glendale	57	4	0	0	0	0	0	0
Greenwood	31	28	0	1	0	0	0	0
Higley	196	146	19	0	0	0	0	0
Mesa	54	6	0	0	0	0	0	0
North Phoenix	55	6	0	0	0	0	0	0
South Phoenix	30	29	2	0	0	0	0	0
South Scottsdale	55	5	1	0	0	0	0	0
West Chandler	50	10	0	0	0	0	0	0
West 43 rd Ave.	109	176	61	14	2	0	0	0
West Phoenix	39	18	2	1	0	0	0	0

Criteria Pollutant Summary

Carbon Monoxide (CO)

During 2005, thirteen CO monitors were reported as operational to the USEPA Air Quality System (AQS). Three of the monitors were classified as NAMS, nine as SLAMS, and one reported as a Special Purpose Monitor (SPM) (Table 5). For calendar year 2005, no exceedances of the CO 1-hour or 8-hour standards were recorded at any MCAQD monitoring sites (see Table 14).

Table 14. 2005 1-hour and 8-hour Average Carbon Monoxide Summary

Site	CO 1-hour Average Max. (PPM) Date; Hour	CO 1-hour Average 2nd High (PPM) Date; Hour	Number of Samples	CO 8-hour Average Max. (PPM) Date; Hour	CO 8-hour Average 2nd High (PPM) Date; Hour	Number of Exceedances of 1/8-Hour average
Buckeye	1.1 01/10;19	1.1 01/13;07	4942	0.9 01/10;21	0.9 12/12;22	0
C. Phoenix	5.2 12/24;23	5.1 12/21;19	8556	4.1 12/22;02	3.8 12/10;04	0
Dysart	1.7 03/16;06	1.7 03/28;06	5005	1.3 03/16;10	1.2 03/15;19	0
Glendale	3.2 09/05;11	3.1 01/06;09	4872	2.4 12/13;01	2.3 12/07;01	0
Greenwood	5.9 12/21;08	5.4 11/22;08	8591	4.2 12/22;02	4.1 12/21;10	0
Mesa	3.4 12/13;21	3.3 12/07;21	4865	2.4 12/12;01	2.4 12/23;01	0
N. Phoenix	3.8 01/31;07	3.5 01/06;08	5021	2.3 12/11;01	2.2 11/11;00	0
S. Phoenix	5.5 12/21;19	5.2 12/21;18	4980	3.8 12/25;02	3.2 12/22;00	0
South Scottsdale	3.2 11/22;18	3.1 01/19;08	4813	2.4 11/23;00	2.4 12/11;01	0
Tempe	3.2 12/13;21	3.0 11/22;08	5000	2.6 12/22;02	2.4 12/13;02	0
West Chandler	3.5 12/13;07	2.7 11/22;20	4998	2.4 12/13;07	2.0 01/01;08	0
W. Indian School	6.8 12/13;07	6.5 01/18;07	8415	5.3 12/25;02	4.8 12/11;02	0
W. Phoenix	7.2 12/25;00	7.0 12/08;07	8407	5.8 12/25;03	4.6 12/10;06	0

Ozone (O₃)

During 2005, seventeen ozone monitors were reported as operational in AQS. Three of the monitors were identified as NAMS, thirteen were identified as SLAMS, and one was identified as a SPM (Table 5). The 1-hour average ozone standard was revoked by the EPA on June 15, 2005, and has been replaced by the 8-hour average standard for compliance purposes; however, the 1-hour averages are summarized here for informational purposes (Table 15).

Table 15. 2005 One Hour Average Ozone Summary

Site	Max. (PPM) Date; Hour	2nd High (PPM) Date; Hour	3rd High (PPM) Date; Hour	4th High (PPM) Date; Hour	Number of Samples
Blue Point	.107 07/19;15	.105 07/18;16	.098 07/20;17	.093 07/21;15	8622
Buckeye	.085 06/30;11	.080 08/06;17	.076 06/21;14	.075 07/21;18	5055
Cave Creek	.108 07/01;13	.093 08/04;14	.092 05/13;17	.092 05/18;17	5072
C. Phoenix	.099 06/23;13	.092 06/20;14	.092 08/07;17	.090 04/16;15	8488
Dysart	.082 08/05;17	.081 06/23;12	.080 08/29;15	.078 05/22;12	5047
Falcon Field	.104 07/19;15	.095 07/14;15	.093 08/04;14	.091 08/03;16	4883
Fountain Hills	.129 07/19;15	.115 07/21;16	.106 07/18;14	.106 08/04;15	8600
Glendale	.096 07/09;15	.093 08/05;17	.090 08/28;12	.088 08/01;15	5058
Humboldt Mt.	.104 06/30;12	.099 07/19;14	.096 06/01;15	.094 07/18;15	4858
N. Phoenix	.110 07/19;13	.109 07/21;14	.108 05/22;13	.102 06/20;14	8622
Pinnacle Peak	.104 07/19;14	.100 07/21;16	.094 07/15;14	.094 07/18;13	8496
Rio Verde	.117 07/01;13	.114 07/21;17	.110 07/18;15	.109 07/19;15	5051
S. Phoenix	.108 06/23;13	.096 07/27;16	.094 06/30;12	.092 07/19;13	8571
S. Scottsdale	.117 07/19;14	.100 05/22;13	.099 07/21;13	.094 06/20;15	8471
Tempe	.111 07/19;13	.104 07/14;14	.099 07/18;13	.097 07/21;14	5061
W. Chandler	.096 07/19;15	.091 05/20;15	.088 08/03;15	.086 05/22;15	5063
West Phoenix	.094 06/20;13	.086 07/19;12	.081 06/23;13	.081 08/28;13	8152

On July 18, 1997 the Environmental Protection Agency promulgated a new ozone standard to ensure a more effective and efficient protection of public health and the environment. This new primary standard for ozone is 0.08 ppm. Compliance with the standard is determined by averaging the 4th highest eight-hour average over a three-year period. This three-year average must be less than or equal to 0.08 ppm. It should be noted that the US Supreme Court has recently allowed the EPA to implement the new ozone standard.

For calendar year 2005, there were eight sites that exceeded the eight-hour primary standard for ozone (an exceedance is any 8-hour average value >.08 ppm; because of mathematical rounding the value is actually 0.085 ppm or greater). Table 16 presents the 2005 data summary for eight-hour ozone at MCAQD monitoring sites. There were no violations of the eight-hour primary standard (the 8-hour average NAAQS for ozone is violated when the three-year average of the fourth high is greater than 0.08 ppm.); however several sites came very close to violating the standard (Table 17).

Table 16. 2005 8-hr Average Ozone Summary

Site	8-hour max. (PPM) Date; Hour	2nd High (PPM) Date; Hour	3rd High (PPM) Date; Hour	4th High (PPM) Date; Hour	Number of Days \geq 0.085
Blue Point	.089 07/18;12	.088 07/20;11	.083 07/19;11	.081 07/21;10	2
Buckeye	.067 08/05;11	.066 04/16;10	.066 08/06;11	.065 05/13;11	0
Cave Creek	.084 08/04;09	.083 05/13;12	.083 07/18;11	.082 05/18;12	0
Central Phoenix	.081 04/16;11	.080 06/23;10	.078 08/07;12	.075 06/19;11	0
Dysart	.073 08/05;11	.069 07/28;10	.067 06/23;09	.066 04/16;11	0
Falcon Field	.081 08/04;11	.078 06/14;11	.078 07/19;10	.076 07/20;10	0
Fountain Hills	.096 07/19;19	.091 07/21;11	.088 07/18;11	.088 07/20;11	6
Glendale	.078 08/05;11	.077 04/16;11	.076 06/19;11	.076 08/07;11	0
Humboldt Mt.	.088 05/13;17	.088 07/18;13	.087 05/18;15	.087 06/30;10	5
North Phoenix	.089 07/21;10	.088 07/19;10	.085 07/09;11	.084 06/20;11	3
Pinnacle Peak	.085 07/19;09	.083 07/18;11	.083 07/21;11	.083 08/04;11	1
Rio Verde	.093 07/18;11	.088 07/21;12	.087 07/01;09	.087 07/19;11	6
South Phoenix	.081 06/23;10	.081 06/30;09	.076 04/16;11	.076 06/19;12	0
South Scottsdale	.089 07/19;10	.084 07/21;08	.079 04/16;11	.077 06/23;09	1
Tempe	.086 07/19;10	.078 07/18;09	.077 04/16;11	.076 06/14;11	1
West Chandler	.082 07/19;10	.076 05/22;10	.075 05/18;12	.075 07/21;10	0
West Phoenix	.072 06/20;11	.071 04/16;11	.069 06/19;11	.068 06/23;10	0

Table 17. 3 Year Average of 8-Hour Ozone

Site	2003 4th High (PPM)	2004 4th High (PPM)	2005 4th High (PPM)	3 Yr. Avg. of 4th High (PPM)
Blue Point	0.086	0.075	0.081	0.081
Buckeye	Not Operating	Not Operating	0.065	0.065
Cave Creek	0.083	0.076	0.082	0.080
Central Phoenix	0.079	0.074	0.078	0.077
Dysart	Not Operating	Not Operating	0.066	0.066
Falcon Field	0.079	0.070	0.076	0.075
Fountain Hills	0.083	0.075	0.088	0.082
Glendale	0.085	0.076	0.076	0.079
Humboldt Mt.	0.087	0.078	0.087	0.084
North Phoenix	0.083	0.080	0.084	0.082
Pinnacle Peak	0.083	0.068	0.083	0.078
Rio Verde	0.076	0.074	0.087	0.079

South Phoenix	0.076	0.072	0.076	0.075
South Scottsdale	0.079	0.073	0.077	0.076
Tempe	0.080	0.072	0.076	0.076
West Chandler	0.078	0.070	0.075	0.074
West Phoenix	0.077	0.072	0.068	0.072

Particulate Matter (PM₁₀)

During 2005, sixteen PM₁₀ monitors were reported as operational in AQS. Five monitors were identified as NAMS; eleven were identified as SLAMS (Table 5). The Central Phoenix site (CP) has both a continuous particulate monitor and a 1 in 6-day SSI High Volume Monitor.

For calendar year 2005, there were five sites that exceeded the PM₁₀ twenty-four hour standard. Additionally, there were six sites that exceeded the PM₁₀ annual standard (summarized in Table 18, detailed in Table 25 on page 22). For calendar year 2005, there were eleven sites that violated the PM₁₀ 24-hour standard and four sites that violated the PM₁₀ annual standard (described in Tables 27 and 28 on pages 23 and 24, respectively).

Table 18. 2005 PM₁₀ Summary

Site Name	24-hr Avg. Max (µg/m ³)	24-hr Avg. 2 nd High (µg/m ³)	Number of 24-hour NAAQS Exceedances	Expected Exceedances	Annual Avg. (µg/m ³)	Number of Samples
Buckeye (continuous)	169*	158*	2	2	52.7*	8593
Central Phoenix	125	76	0	0	38.5	58
Central Phoenix (continuous)	116	104	0	0	37.1	8466
Chandler	130	115	0	0	49.4	58
Durango Complex (continuous)	206*	200*	13	13	66.4*	8617
Dysart	76	68	0	0	29.0	61
Glendale	84	56	0	0	29.0	61
Greenwood	173*	95	1	6	52.3*	60
Higley (continuous)	142	121	0	0	51.4*	8628
Mesa	86	55	0	0	30.0	60
North Phoenix	81	72	0	0	29.6	61
South Phoenix	147	107	0	0	54.7*	61
South Scottsdale	121	96	0	0	34.0	61
West Chandler	94	68	0	0	34.2	60
West 43 rd Ave (continuous)	233*	200*	13	13.1	73.9*	8617
West Phoenix	155*	103	1	6	44.5	60

* Indicates an exceedance of the standard.

In April of 2005 the EPA agreed with the ADEQ assessment that the exceedances of the 24-hr standard that occurred on August 13, 2004 were caused by exceptional events. The sites that exceeded were Durango Complex, Higley, and West 43rd Avenue. They also agreed that the exceedance of the 24-hr standard that occurred at the Buckeye site on September 18, 2004 was attributable to an exceptional event. With this designation, these values will not count against the County's attainment status for the 2005 annual standard (in the 3 year averages).

On July 2, 2002 (67 FR 44369), EPA found the state implementation plan (SIP) for the Metropolitan Phoenix (Maricopa County), Arizona serious PM₁₀ non-attainment area to be inadequate to attain the 24-hour particulate (PM₁₀) air quality standard at the Salt River monitoring site. Under authority from the Clean Air Act, EPA has required a SIP revision to be submitted by the State of Arizona to correct the inadequacy. In 2004 the Arizona Department of Environmental Quality submitted a SIP addressing the inadequacies in the Salt River Area to the EPA.

Particulate Matter (PM_{2.5})

Currently, MCAQD operates collocated compliance PM_{2.5} monitors at the West Phoenix site (04-013-0019) and single monitors at the Mesa site (04-013-1003) and the South Phoenix site (04-013-4003). The ADEQ continues to weigh the filters for all of the monitors, but MCAQD has installed a laboratory in its facility and plans to take over this task in 2006. In addition, MCAQD operates two continuous PM_{2.5} monitors at the Durango (04-013-9812) and West Phoenix (04-013-0019) sites. These continuous monitors are FDMS TEOMs, which are not Federal Reference Methods; therefore the data collected from them is not used for compliance purposes. All monitors are identified as SLAMS (Table 5).

There were no exceedances of the 24-hour or annual PM_{2.5} standards in 2005. Maricopa County is currently in attainment for PM_{2.5}.

Table 19. 2005 PM_{2.5} Summary

Site Name	24-hr Avg. Max (µg/m ³)	24-hr Avg. 2 nd High (µg/m ³)	98 th Percentile Value	Annual Avg. (µg/m ³)	Number of Samples
Mesa	17.8	13.0	13.0	8.51	81
South Phoenix	56.7	24.8	24.8	11.46	118
West Phoenix	39.2	25.7	25.7	11.08	119

Table 20. 2005 Continuous PM_{2.5} Data Summary

Site Name	24-hr Avg. Max (µg/m ³)	24-hr Avg. 2 nd High (µg/m ³)	98 th Percentile Value	Number of Exceedances	Annual Avg. (µg/m ³)	Number of Samples
Durango Complex (continuous)	N/A	N/A	#	#	N/A	0
West Phoenix (continuous)	52.3	46.9	#	0	N/A	2762

Indicates <75% data availability.

Nitrogen Dioxide (NO₂)

All parts of Maricopa County are in attainment for nitrogen dioxide. During 2005, five NO₂ monitors were operational and were reported in AQS. Two monitors were designated as NAMS monitors and three were designated as SLAMS (see Table 5).

For calendar year 2005, no exceedances of the NO₂ annual standard were recorded at MCAQD monitoring sites (Table 21).

Table 21. 2005 Nitrogen Dioxide Summary

Site	NO ₂ Avg. 1-hour Max. (PPM) Date; Hour	NO ₂ Avg. 1-hour 2nd High (PPM) Date; Hour	Number of 1-hour Samples	Annual Average (PPM)
Buckeye	.053 11/09;15	.052 01/05;07	8307	.0119
Central Phoenix	.095 12/21;11	.090 12/21;22	8490	.0262
Greenwood	.131 11/22;09	.117 12/21;10	8467	.0315
South Scottsdale	.079 12/21;14	.077 12/21;18	8424	.0196
West Phoenix	.100 12/21;10	.098 11/22;10	8191	.0235

Sulfur Dioxide (SO₂)

Maricopa County is in attainment for SO₂. During 2005, two SO₂ monitors were operational and were reported in AQS. Both of these monitors were designated NAMS sites (see Table 5). For calendar year 2005, no exceedances of the SO₂ annual, 24-hour, or 3-hour standard were recorded at Maricopa County monitoring sites (see Table 22).

Table 22. 2005 Sulfur Dioxide Summary

Site	1-hour Max. (PPM) Date; Hour	1-hour 2nd High (PPM) Date; Hour	3-hour Max. (PPM) Date; Hour	3-hour 2nd High (PPM) Date; Hour	24-hour Max. (PPM) Date; Hour	24-hour 2nd High (PPM) Date; Hour	Annual Avg. (PPM)	Number of Samples
Central Phoenix	.042 12/09;19	.017 04/04;13	.021 12/09;20	.012 12/05;08	.008 12/09;23	.007 11/22;23	.0021	8589
South Scottsdale	.012 01/17;18	.011 06/24;23	.007 10/11;20	.006 10/07;02	.006 10/06;23	.006 10/07;23	.0017	8380

2005 NAAQS Exceedance and Violation Summary

The following is a summary of the number, types and dates of exceedances and violations of the NAAQS for 2005 (Table 23).

Table 23. 2005 NAAQS Exceedances and Violations Summary

Carbon Monoxide	No exceedances or violations of the 1-hr or 8-hr NAAQS standard were logged.
Nitrogen Dioxide	No exceedances or violations of NAAQS were logged.
Ozone	There were nine unique days when at least one monitor exceeded the 8-hr NAAQS. Altogether there were 25 exceedances of the 8-hr standard. There were no violations of the 8-hr standard in 2005. See Table 24 for exceedance details.
PM₁₀	There were nineteen unique days when at least one monitor exceeded the 24-hr NAAQS. All together there were 30 exceedances of the 24-hr standard. There were 11 violations of the 24-hr standard in 2005. See Table 25 for exceedance details. See Table 27 for violation details.
	Six sites exceeded the PM ₁₀ annual standard. Four sites violated the PM ₁₀ annual standards in 2005. See Table 26 for exceedance details. See Table 28 for violation details.
PM_{2.5}	No exceedances or violations of NAAQS were logged
Sulfur Dioxide	No exceedances or violations of NAAQS were logged.

Table 24. 2005 Ozone 8-hour Average Exceedance Details

Site	Date	Value (ppm)
Blue Point	7/18/05	.089
	7/20/05	.088
Fountain Hills	5/19/05	.085
	7/18/05	.088
	7/19/05	.096
	7/20/05	.088
	7/21/05	.091
	8/04/05	.086
Humboldt Mountain	5/04/05	.085
	5/13/05	.088
	5/18/05	.087
	6/30/05	.087
	7/18/05	.088
North Phoenix	7/09/05	.085
	7/19/05	.088
	7/21/05	.089
Pinnacle Peak	7/19/05	.085
Rio Verde	7/01/05	.087
	7/18/05	.093
	7/19/05	.087
	7/20/05	.087
	7/21/05	.088
	8/04/05	.087
South Scottsdale	7/19/05	.089
Tempe	7/19/05	.086

Note: Exceedance is any 8-hour average with value $\geq .085$ ppm.

Table 25. 2005 PM₁₀ 24-hour Average Exceedance Details

Site	Date	Value (µg/m ³)
Buckeye	06/21/05	158.0
	11/18/05	169.6
Durango Complex	11/3/05	163.8
	11/17/05	156.2
	11/22/05	189.6
	11/23/05	165.0
	12/1/05	158.8
	12/2/05	165.0
	12/12/05	206.8
	12/13/05	166.0
	12/14/05	181.2
	12/15/05	156.4
	12/21/05	200.3
	12/22/05	179.1
	12/23/05	157.5
Greenwood	12/12/05	172.7 (1-in-6 day schedule)
West 43 rd Avenue	4/4/05	172.8
	11/1/05	166.5
	11/2/05	174.0
	11/10/05	166.2
	11/22/05	173.4
	11/23/05	175.5
	12/2/05	195.2
	12/12/05	233.0
	12/13/05	167.7
	12/14/05	177.1
	12/21/05	200.6
	12/22/05	168.3
	12/23/05	156.6
West Phoenix	12/12/05	155.0 (1-in-6 day schedule)

Note: Exceedance is any 24-hour average with value ≥ 155 µg/m³.

Table 26. 2005 PM₁₀ Annual Average Exceedance Details

Site	Value (µg/m ³)
Buckeye	53
Durango Complex	66
Greenwood	52
Higley	51
South Phoenix	55
West 43 rd Avenue	74

Note: Exceedance is any annual average with value > 50 µg/m³.

2005 Violations of the 24-Hour PM₁₀ Standard

The 24hr NAAQS for particulates is violated when the rate of expected occurrence of exceedances (samples greater than or equal to 155 µg/m³) is greater than one over three consecutive years (Table 27) (40 CFR Part 50.6 (a)).

Table 27. Violations of the 24-hr PM₁₀ Standard

Site	2003		2004		2005		Rate of Expected Exceedances
	24-hr Max. (µg/m ³)	Expected Exceedances	24-hr Max. (µg/m ³)	Expected Exceedances	24-hr Max. (µg/m ³)	Expected Exceedances	
Buckeye	NA	NA	289#	#	169	2	#
Central Phoenix	114	0	81	0	125	0	0
Central Phoenix (continuous)	183	3.1	94	0	116	0	1
Chandler	240	6	150	0	130	0	2
Durango Complex	195	6	209‡	0	206	13	6.3
Dysart	133#	0	94	0	76	0	#
Glendale	151	0	69	0	84	0	0
Greenwood	166	6	100	0	173	6	4
Higley	225	6	493‡	1	142	0	2.3
Mesa	176	6	49	0	86	0	2
North Phoenix	155	6	46	0	81	0	2
South Phoenix	164	6	132	0	132	0	2
South Scottsdale	172	6	77	0	121	0	2
West Chandler	206	14	70	0	94	0	4.6
West 43rd Avenue	157	6	251‡	0	233	13.1	6.4
West Phoenix	158	6.4	100	0	155	6	4.1

■ Indicates violation of the standard.

Indicates <75% data available.

‡ Indicates an Exceptional Event which waived the exceedance. This Exceptional Event is not listed in the 24-hr Max values.

2005 Violations of the Annual Particulate Standard

The Annual NAAQS for particulates is violated when the three-year average of the annual averages is greater than 50 $\mu\text{g}/\text{m}^3$ (Table 28) (40 CFR Part 50.6 (b)).

Table 28. Violations of the Annual PM_{10} Standard

Site	2003 Annual Avg. ($\mu\text{g}/\text{m}^3$)	2004 Annual Avg. ($\mu\text{g}/\text{m}^3$)	2005 Annual Avg. ($\mu\text{g}/\text{m}^3$)	Three-Year Average ($\mu\text{g}/\text{m}^3$)
Buckeye	Not Operating	#	53	#
Central Phoenix	40	32	39	37
Central Phoenix (continuous)	43	37	37	39
Chandler	50	40	49	46
Durango Complex	62	52‡	66	60
Dysart	#	27	29	#
Glendale	36	26	29	30
Greenwood	51	44	52	49
Higley	62	48‡	51	54
Mesa	34	23	30	29
North Phoenix	34	25	30	30
South Phoenix	52	46	55	51
South Scottsdale	36	26	34	32
West Chandler	42	30	34	35
West 43rd Avenue	62	61‡	74	66
West Phoenix	46	37	45	43

■ Indicates violation of the standard.

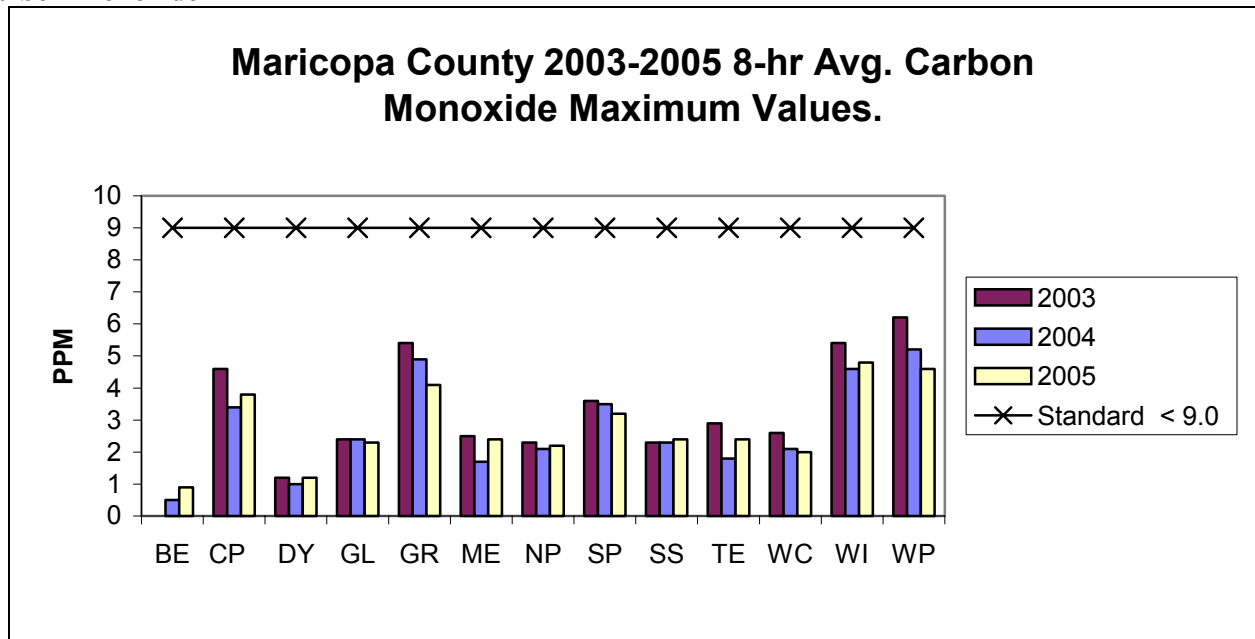
Indicates <75% data available.

‡ Indicates an Exceptional Event which waived the exceedance. This Exceptional Event is not included in the Annual Average values.

Pollution Trends

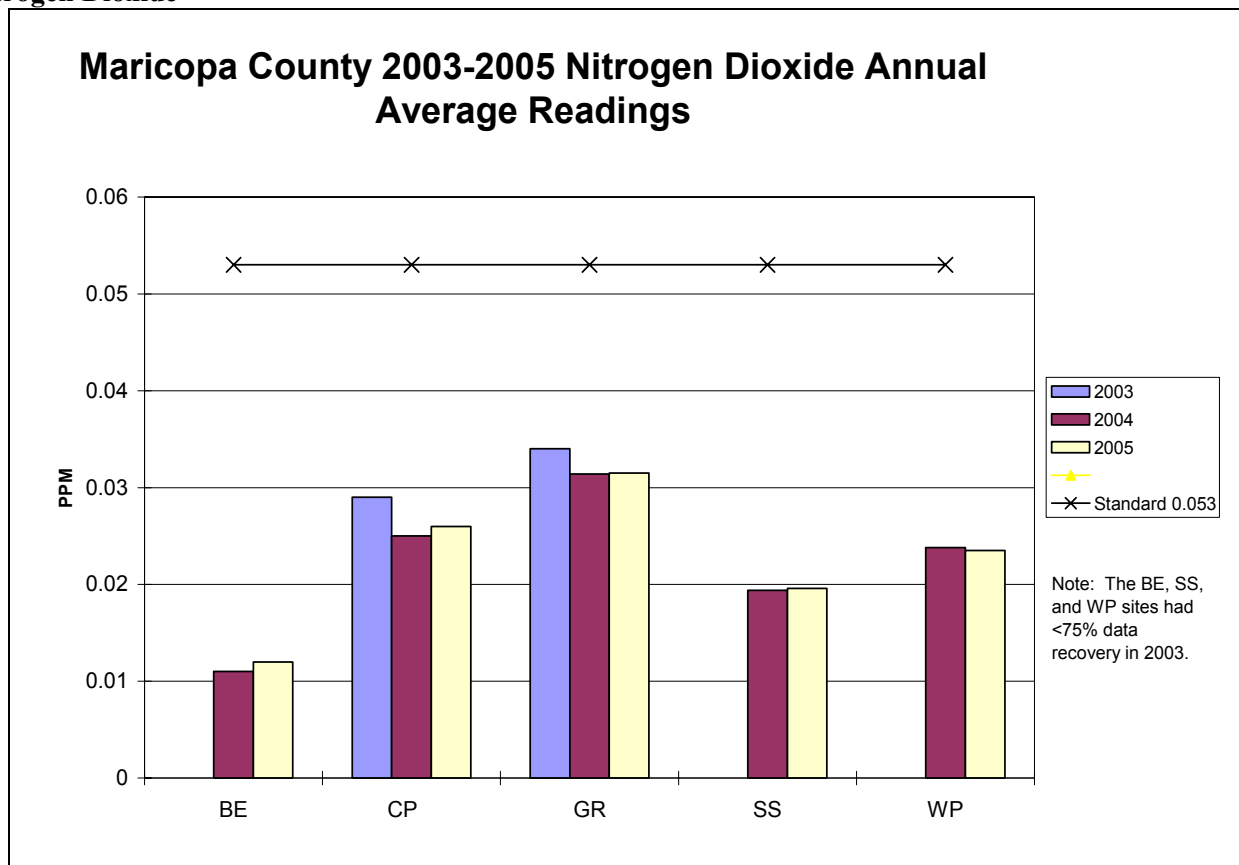
The following charts depict the most recent three-year trends (2003–2005) for each criteria pollutant.

Carbon Monoxide



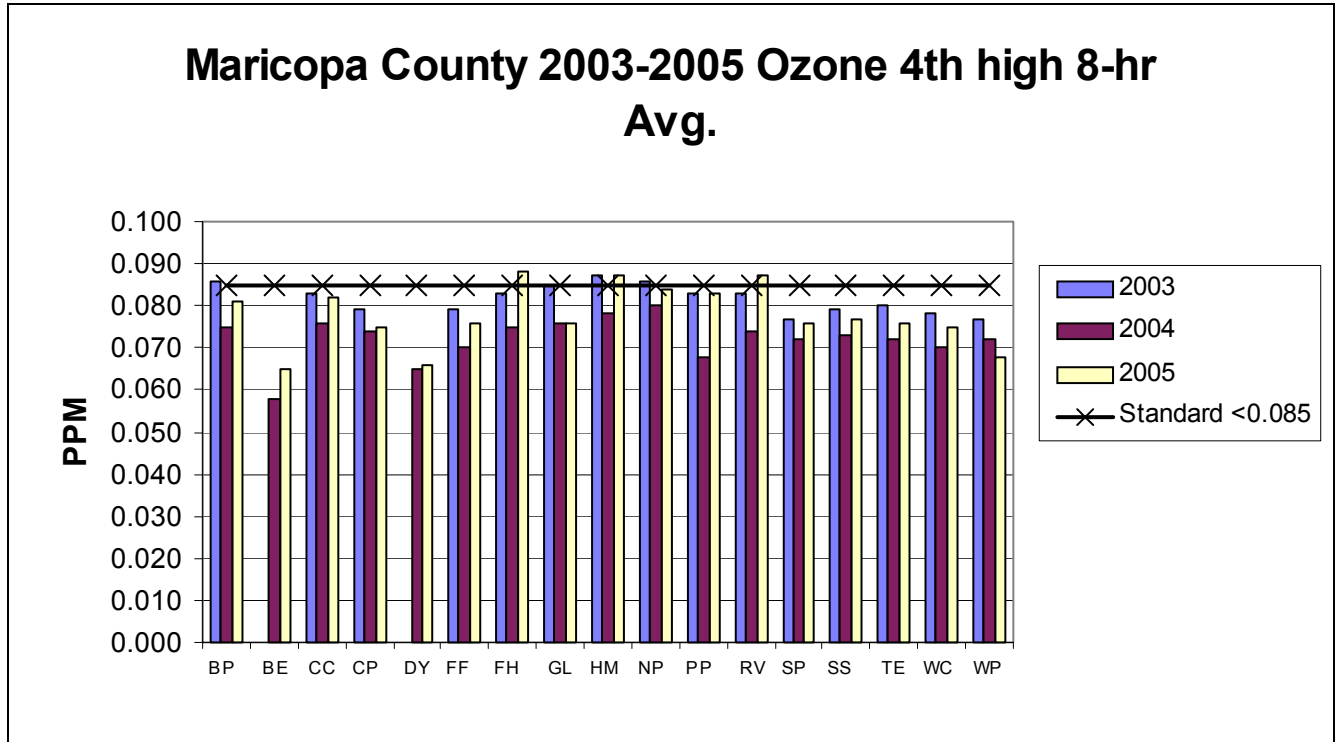
(Chart -1)

Nitrogen Dioxide



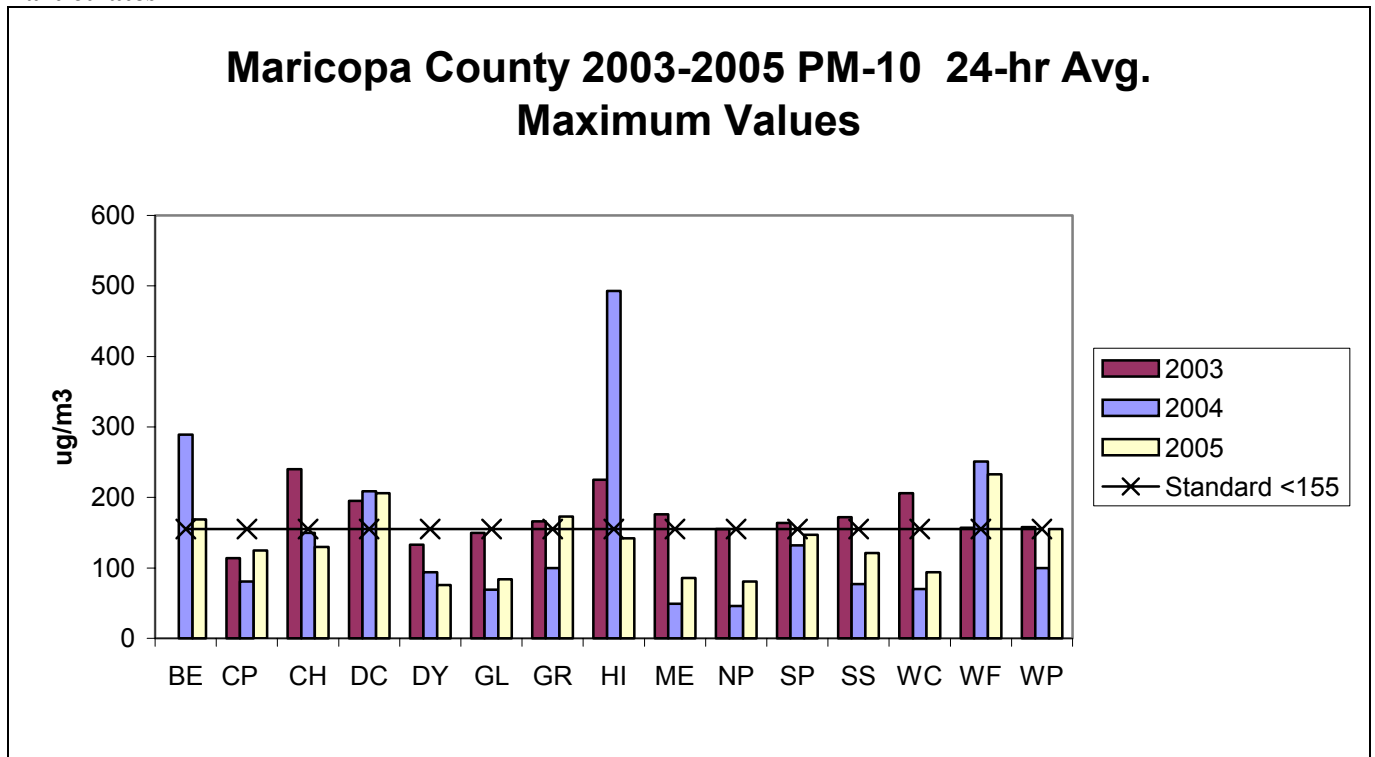
(Chart -2)

Ozone



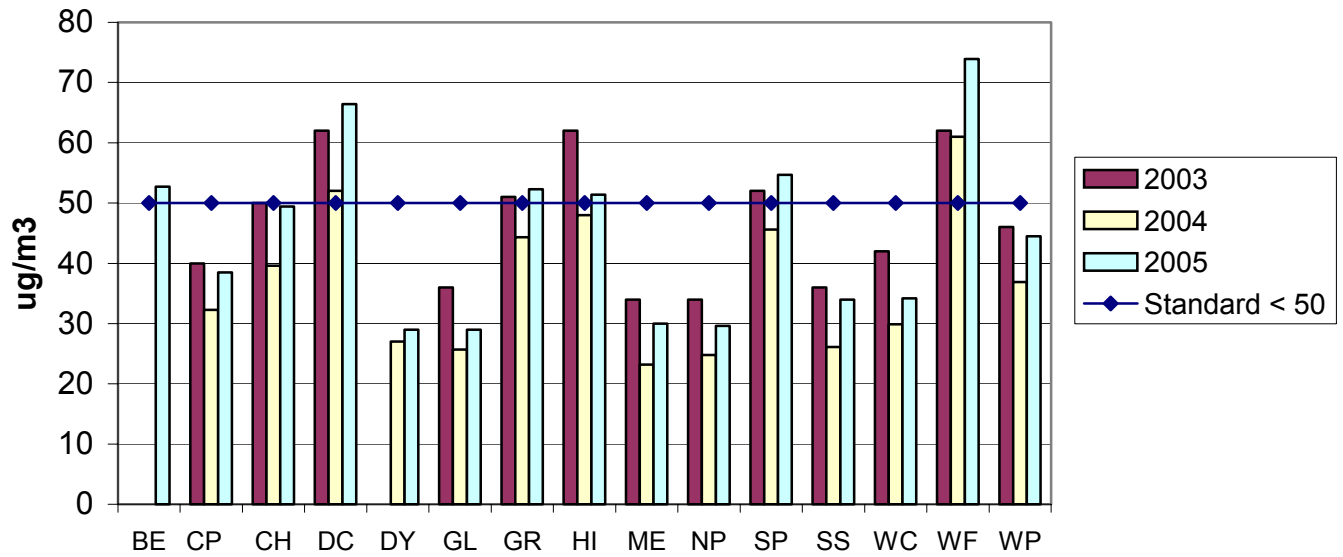
(Chart -3)

Particulates



(Chart -4)

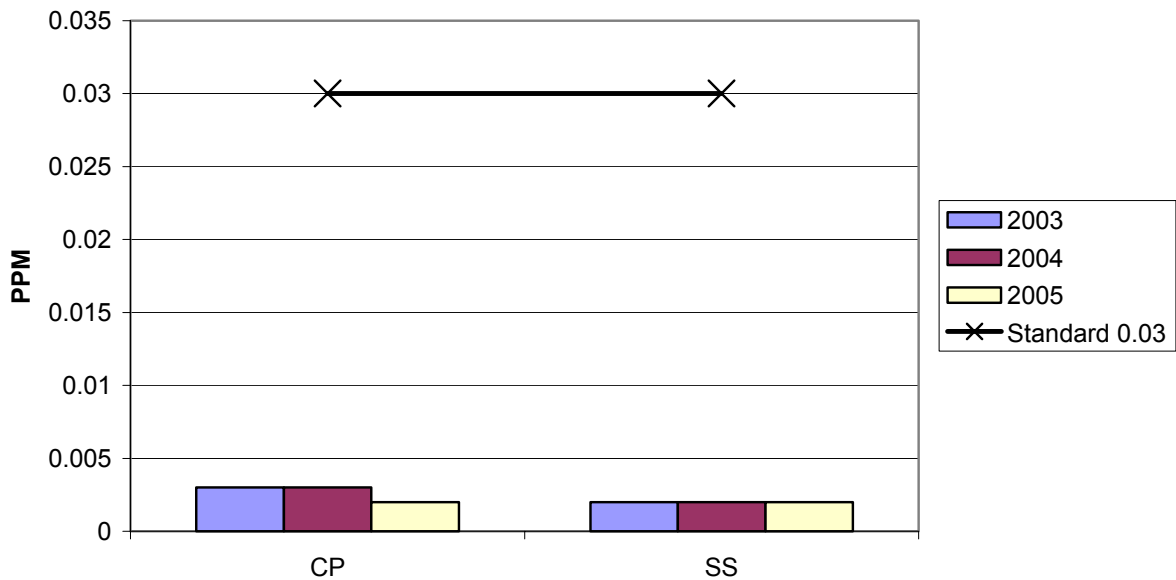
Maricopa County 2003-2005 PM-10 Annual Avg.



(Chart -5)

Sulfur Dioxide

Maricopa County 2003 - 2005 Sulfur Dioxide Annual Avg.



(Chart -6)

Special Projects and Network Changes

Air quality issues such as the SIP, natural events policy, and permits for new sources are diverse and controversial subjects for the citizens of Maricopa County. Since no policies can be made without high-quality monitoring data, the MCAQD Air Monitoring Division strives to provide the most reliable and relevant air monitoring data to the public. The following is a list of projects and changes that have occurred during the year 2005.

Seasonal Monitors

MCAQD continues to run some of its carbon monoxide (CO) monitors and ozone (O₃) monitors on a seasonal basis (Table 29). Having part of the network operating seasonally allows the County to upgrade instruments, perform preventive maintenance, extend the life expectancy of the instruments, reduce replacement costs, and better utilize its QA and QC resources on the remaining instruments.

Table 29. Seasonal Monitors

Seasonal Carbon Monoxide Monitors (Operational Sept. 1 – Apr. 1)	Seasonal Ozone Monitors (Operational Apr. 1 – Nov. 1)
Buckeye	Buckeye
Dysart	Cave Creek
Glendale	Dysart
Mesa	Falcon Field
North Phoenix	Glendale
South Phoenix	Humboldt Mountain
South Scottsdale	Rio Verde
Tempe	Tempe
West Chandler	West Chandler

The Consideration of Additional Sites/Monitors

MCAQD continues to evaluate the PM₁₀ network for possible additional sites for determining the impact on ambient pollution levels of significant sources or source categories. The significant sources would include industry and agriculture. The allocation of both financial and personnel resources continue to remain significant obstacles to the establishment of new monitoring sites.

New Sites

MCAQD has not started any new sites in 2005, although we are considering possible new site locations for late 2006 in the West Valley at the I-10 and Loop-101 interchange and in the Agua Fria riverbed near Sun City.

Closed Sites/Monitors

MCAQD closed the Chandler site (04-013-0021) on December 31, 2005 at the request of the City of Chandler, which owns the property that the site is located on. The Higley site (04-013-4006) will take over the functions of the Chandler site.

Other Network Changes/Special Projects/Comments

MCAQD continues to participate in the Joint Air Toxic Assessment Project (JATAP) in conjunction with the Arizona Department of Environmental Quality (ADEQ) and Phoenix area Urban Tribal Communities. We have been providing space at our existing sites (South Phoenix, West Phoenix, and Greenwood) for Hazardous Air Pollutants (HAP) monitoring.

ADEQ, in conjunction with MCAQD, has developed a year-round air quality forecasting capability for the Phoenix metropolitan area. ADEQ takes the lead on air quality forecasting and issuing of High Pollution Advisories, while MCAQD provides monitoring data and designates No-Burn Days.

MCAQD is continuing its distribution of air monitoring data to the public by posting one-hour continuous data on the Internet. Additionally, MCAQD participates in the EPA Ozone Mapping AIRNOW website (see ADDITIONAL COMMENTS). The corresponding websites are as follows:

Maricopa County Air Quality Dept: <http://www.maricopa.gov/aq/status/map.aspx>
AIRNOW: <http://www.epa.gov/airnow>

In accordance with 40 CFR Part 50 Appendix K; MCAQD has converted two of its one-in-six day particulate monitors to a continuous monitoring schedule (see next section).

Converting to Continuous Particulate Monitoring

As of December 31, 2005, in accordance with 40 CFR Part 50 Appendix K, MCAQD has converted two of its one-in-six day particulate monitors to continuous. These monitors are at the following sites: Greenwood (04-013-3010), and West Phoenix (04-013-0019). The EPA's Air Quality System (AQS) database will not allow the existing monitors to be changed from one-in-six day to hourly (at least not until the beginning of the year), so data from the continuous monitors will begin to be entered into AQS in January 2006.

ADDITIONAL COMMENTS

EPA Ozone Mapping

The AIRNOW website (<http://www.epa.gov/airnow>) provides real-time air pollution (ozone and PM_{2.5}) maps for major metropolitan areas around the United States, including the Phoenix Metropolitan Area. MCAQD has participated in the program since 2001.

MCAQD, in cooperation with ADEQ and the Pinal County Air Pollution Control District, has expanded the area that the maps cover. This area now includes sites as far east as Queen Creek, as far south as Casa Grande, and as far west as Palo Verde.

This website can be used as a tool for which the public can plan their daily activities and limit their exposure to air pollution. Eight-hour average peak ozone concentration maps and real-time eight-hour ozone animation maps are provided. Colors on the map indicate different concentrations of ozone pollution. The one-hour average values are given in parts per billion. The eight-hour averages are converted into Air Quality Index (AQI) numbers. The AQI is based on the NAAQS. The index was developed to convert pollution measurements into a common index that the general public can more easily understand. Different colors on the map correspond to different categories of air quality and health impacts (Table 30).

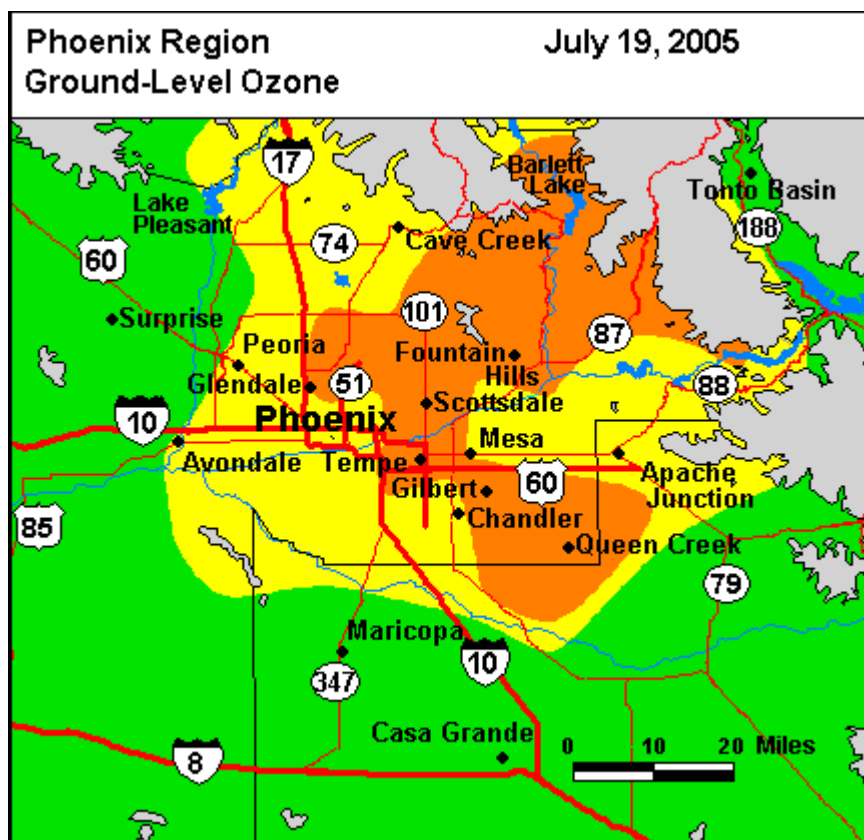


Table 30. Air Quality Index

Index	Color Designation	Air Quality	Health Impact
0 – 50	Green	Good	No harmful effects expected.
51 – 100	Yellow	Moderate	Unusually sensitive people should consider limiting prolonged outdoor exertion.
101 – 150	Orange	Unhealthy for Sensitive Groups	Active children & adults, people with respiratory disease (i.e., asthma) should limit prolonged outdoor exertion.
151 – 200	Red	Unhealthy	Everyone should observe caution. Avoid prolonged outdoor exertion.
201 – 300	Purple	Very Unhealthy	Avoid all outdoor exertion. Use extreme caution outdoors
301 – 500	Maroon	Hazardous	Everyone should avoid all outdoor exertion.

The animated map is updated every hour from 8am to 8pm seven days a week. Updates to the site will be made during the ozone season (April through October).

Maricopa County's Interactive Pollution Map

In the spirit of our mission statement of “Protecting our most vital natural resource”, MCAQD has brought real-time pollution data to the Internet. All of the MCAQD continuous data will be available to the public through an interactive map. The air pollutants that are available include CO, Ozone, NO₂, SO₂, and Particulates. All of the values are currently one-hour averages. The information is updated on an hourly basis at half past the hour. Data can be accessed at the web address: <http://www.maricopa.gov/aq/status/map.aspx>.

One of the major problems in providing “real-time” pollution data to a public medium is providing quality data. The data available on the Internet goes through an automated quality assurance check program before it is released; however, some invalid data can slip through. Normal quality assurance checks take between one and three months. Consequently, information provided at this site should be used for informational purposes only and should not be relied on for comparison with NAAQS.

This website will go through a major overhaul in 2006 to provide even more “real-time” pollution data. The interactive map will get a new look, more sites and pollutants will be represented, and other changes such as seasonal and temporary monitors will be displayed.

REFERENCES

1. Code of Federal Regulations, Chapter 40, Part 50 and 58, 1997
2. EPA's AirData (AQS) information: <http://www.epa.gov/air/data/index.html>
3. EPA's NAAQS Info: <http://www.epa.gov/air/criteria.html>
4. SIP Information: <http://www.adeq.state.az.us/environ/air/plan/index.html>
5. EPA's Air Program Information: <http://www.epa.gov/rgytgrnj/programs/artd/air/quality/quality.htm>
6. MCAQD Air Monitoring Map: http://www.maricopa.gov/sbeap/AIR_MONI.HTM
7. EPA's EMPACT Site. <http://www.epa.gov/empact>
8. AIRNOW: <http://airnow.gov/>
9. Criteria Pollutant Information: <http://www.epa.gov/air/urbanair/6poll.html>
10. MCAQD 2003 & 2004 Network Reviews: <http://www.maricopa.gov/aq/status/network.aspx>
11. SLAMS / NAMS / PAMS Network Review Guidance--EPA-454/R-98-003
12. Guideline on data handling conventions of the PM NAAQS

APPENDIX

Monitoring Site Details (Photos and Specific Information)

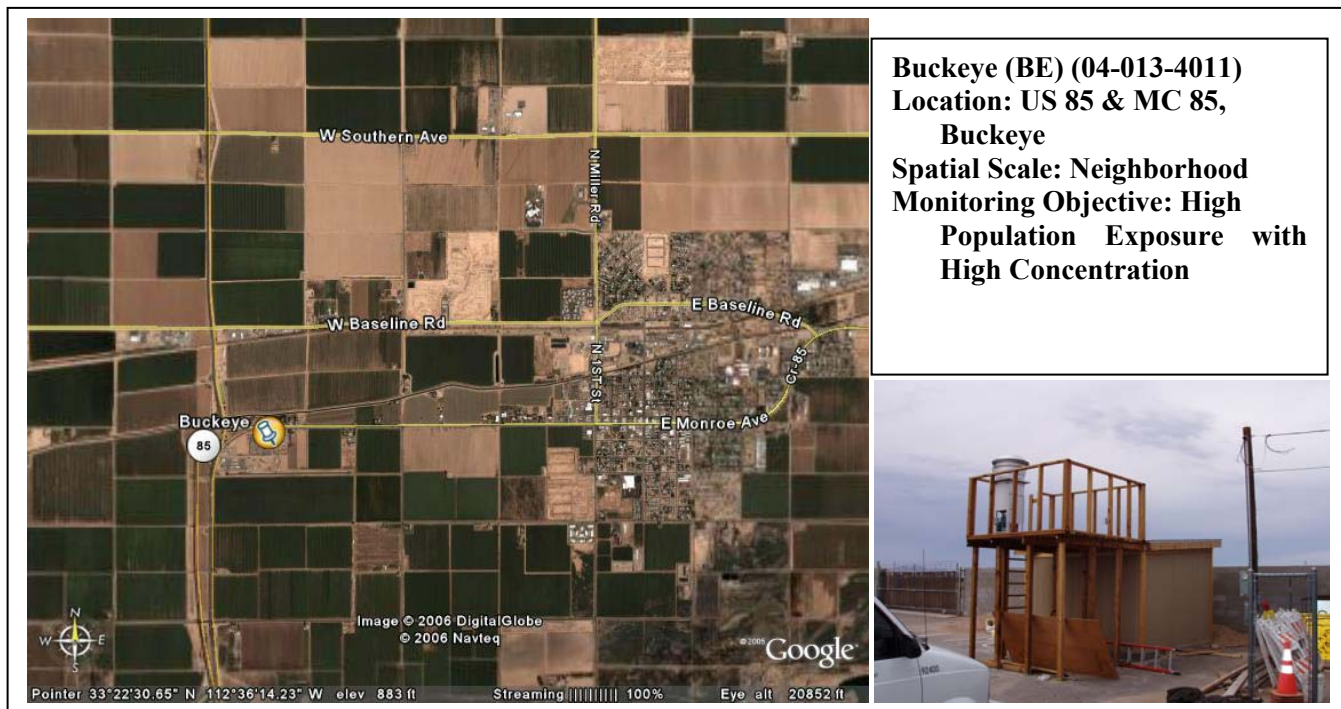


Maricopa County Blue Point Air Monitoring Site

Site Description: The Blue Point site became operational in July 1995 and is located in a Maricopa County Sheriff's Sub-Station in Tonto National Forest. This site represents the maximum ozone concentration, and urban-scale downwind transport conditions. This site is located approximately 40 miles east of the Phoenix metropolitan area. Ozone is the only criteria pollutant monitored at this NAMS station. Wind speed and direction are also monitored at the site.

	2003	2004	2005
Max. 1-hr O ₃ Avg. (PPM)	0.122	0.110	0.107
Max. 8-hr O ₃ Avg. (PPM)	0.103*	0.081	0.089*
O ₃ Number of Daily Exceedances >0.085 ppm	4	0	2
O ₃ Three year average of 4 th High	0.084	0.082	0.081

*Indicates an exceedance of the standard.



Buckeye (BE) (04-013-4011)
Location: US 85 & MC 85,
Buckeye
Spatial Scale: Neighborhood
Monitoring Objective: High
Population Exposure with
High Concentration

Maricopa County Buckeye Air Monitoring Site

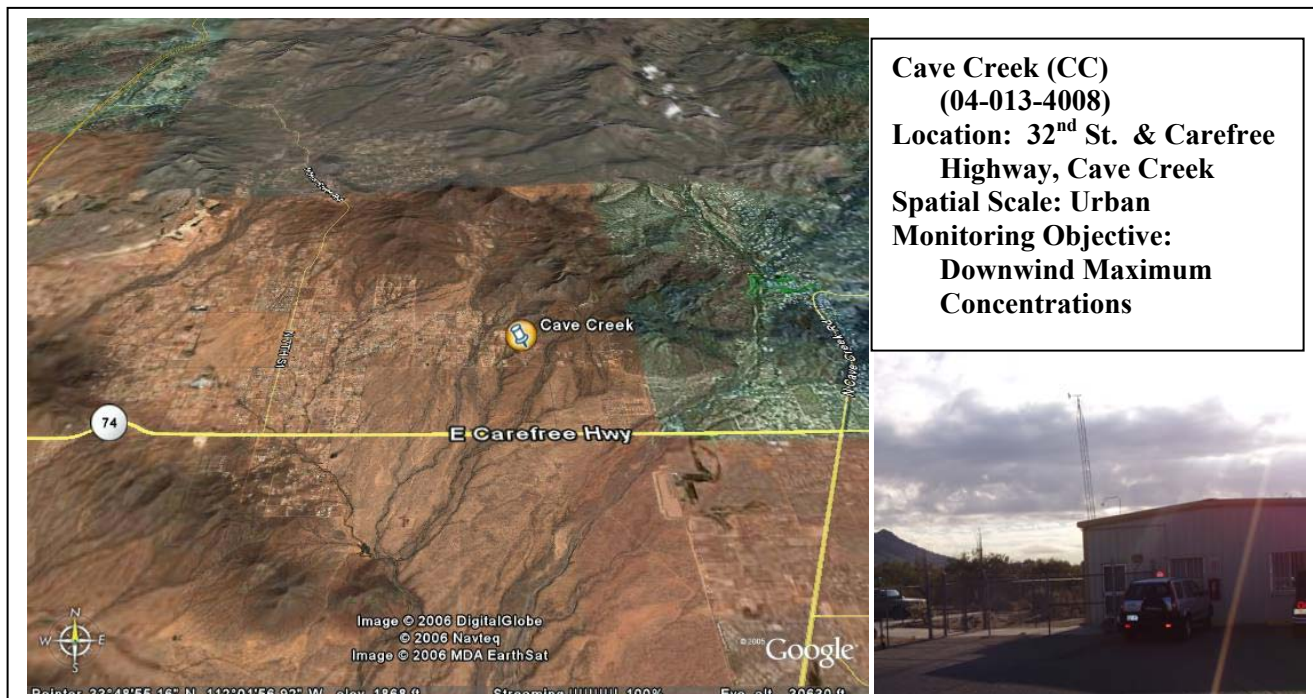
Site Description: The Buckeye site was established on August 1, 2004. This site is a SLAMS location for carbon monoxide, ozone, PM₁₀, and NO₂ criteria pollutants. The site is located in the Maricopa County Department of Transportation Southwest Facility. The site is in an area of agriculture and encroaching residential development. The PM₁₀ monitor was changed from 1-in-6 day to hourly as of October 1, 2004.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	Not operating	0.5	0.9
Number exceedances 8-hr CO	Not operating	0	0
Max. 1-hr O ₃ Avg. (PPM)	Not operating	0.088	0.085
Max. 8-hr O ₃ Avg. (PPM)	Not operating	0.068	0.067
O ₃ Number of Daily Exceedances >0.085 PPM	Not operating	0	0
O ₃ Three year avg. of 4 th High	Not operating	#	#
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	Not operating	~ 289*‡	169*
Number exceedances 24-hr PM ₁₀	Not operating	1	2
Annual PM ₁₀ Avg. (µg/m ³)	Not operating	#	53*
Annual NO ₂ Avg. (PPM)	Not operating	#	.0119

*Indicates an exceedance of the standard.

Indicates <75% data recovery.

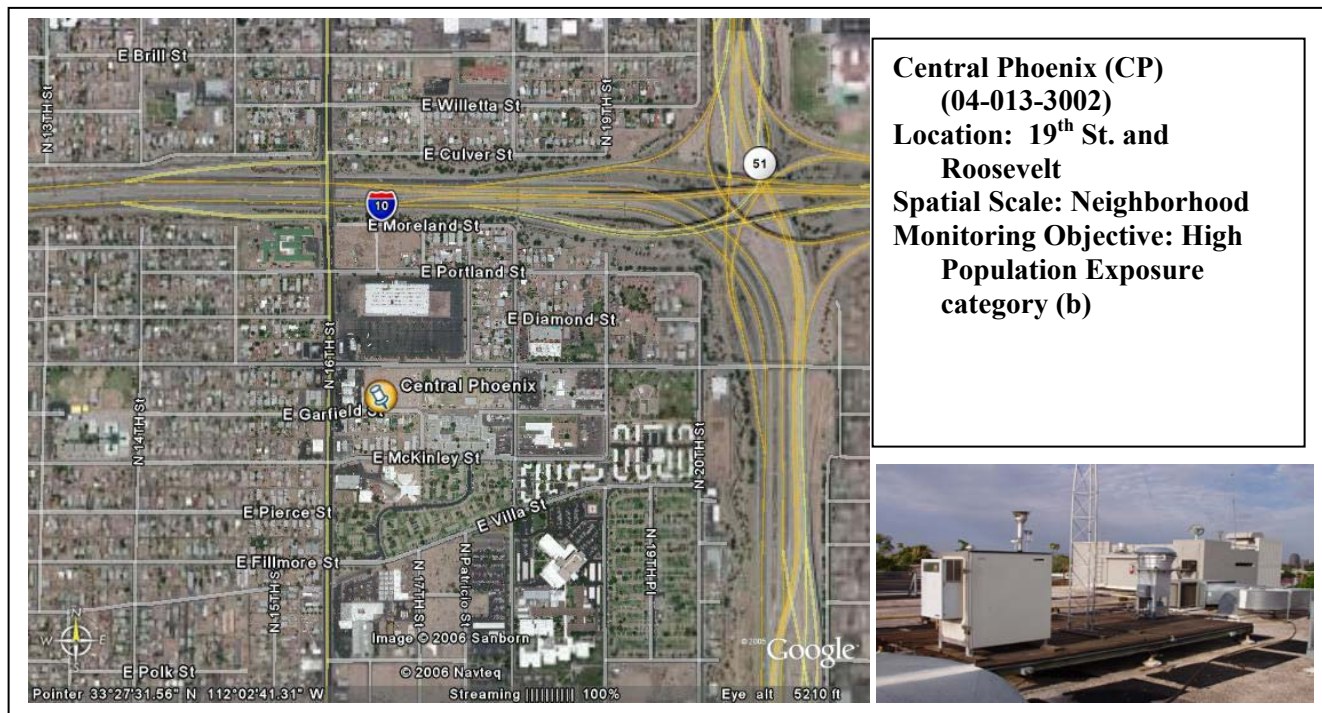
‡ Indicates Exceptional Events



Maricopa County Cave Creek Air Monitoring Site

Site Description: The Cave Creek site became operational in August 2001 and is located in the Maricopa County Cave Creek Recreation Area (Park Office). This site was chosen through discussions on modifying the ozone network for the new 8-hr ozone standard. Ozone is the only criteria pollutant monitored at this SLAMS station. Wind speed and direction are also monitored at the site.

	2003	2004	2005
Max. 1-hr O ₃ Avg. (PPM)	0.102	0.092	0.108
Max. 8-hr O ₃ Avg. (PPM)	0.088	0.079	0.084
O ₃ Number of Daily Exceedances >0.085	2	0	0
Three year avg. of 4 th High	0.084	0.081	0.080

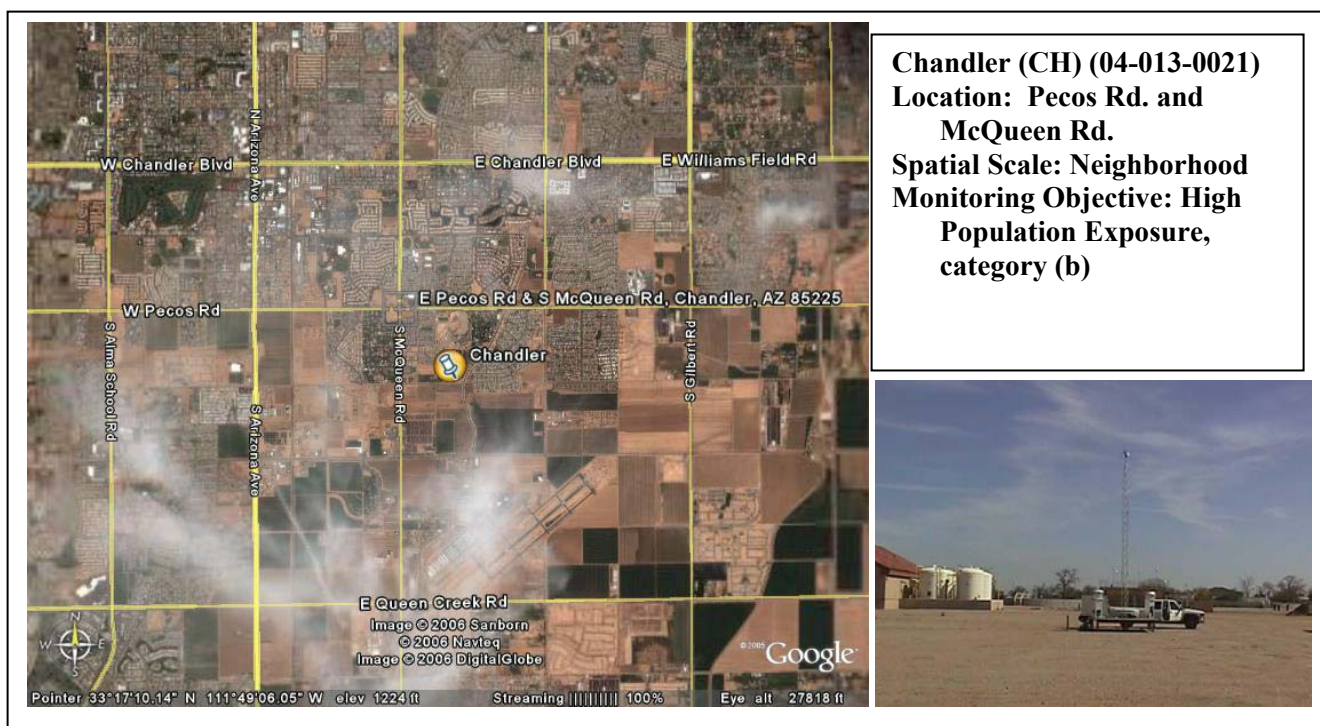


Maricopa County Central Phoenix Air Monitoring Site

Site Description: The Central Phoenix site has been in existence for over three decades and has provided a long-term historical database with a high rate of data recovery. The site is representative of high population exposure (greater than 5000 people per square mile) in the central Phoenix area. This site is a NAMS location for carbon monoxide, ozone, PM₁₀, SO₂ and NO₂ criteria pollutants.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	4.6	3.4	4.1
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.102	.100	.099
Max. 8-hr O ₃ Avg. (PPM)	0.084	.078	.081
O ₃ Number of Daily Exceedances >0.085	0	0	0
O ₃ Three year avg. of 4 th High	0.076	.076	.077
Max. 24-hr PM ₁₀ Avg. 1-in-6 day (µg/m ³)	114	81	125
Number exceedances 1-in-6 day 24-hr PM ₁₀	0	0	0
Annual PM ₁₀ Avg. 1-in-6 day monitor (µg/m ³)	40	32	39
Max. 24-hr PM ₁₀ Avg. Continuous (µg/m ³)	183*	94	116
Number exceedances Continuous 24-hr PM ₁₀	3	0	0
Annual PM ₁₀ Avg. Continuous (µg/m ³)	43	37	37
Annual NO ₂ Avg. (PPM)	0.029	0.025	0.0262
Max. 24-hr SO ₂ Avg. (PPM)	0.007	.008	.008
Number of Exceedances	0	0	0
Annual SO ₂ Avg. (PPM)	0.003	.003	.0021

*Indicates an exceedance of the standard.

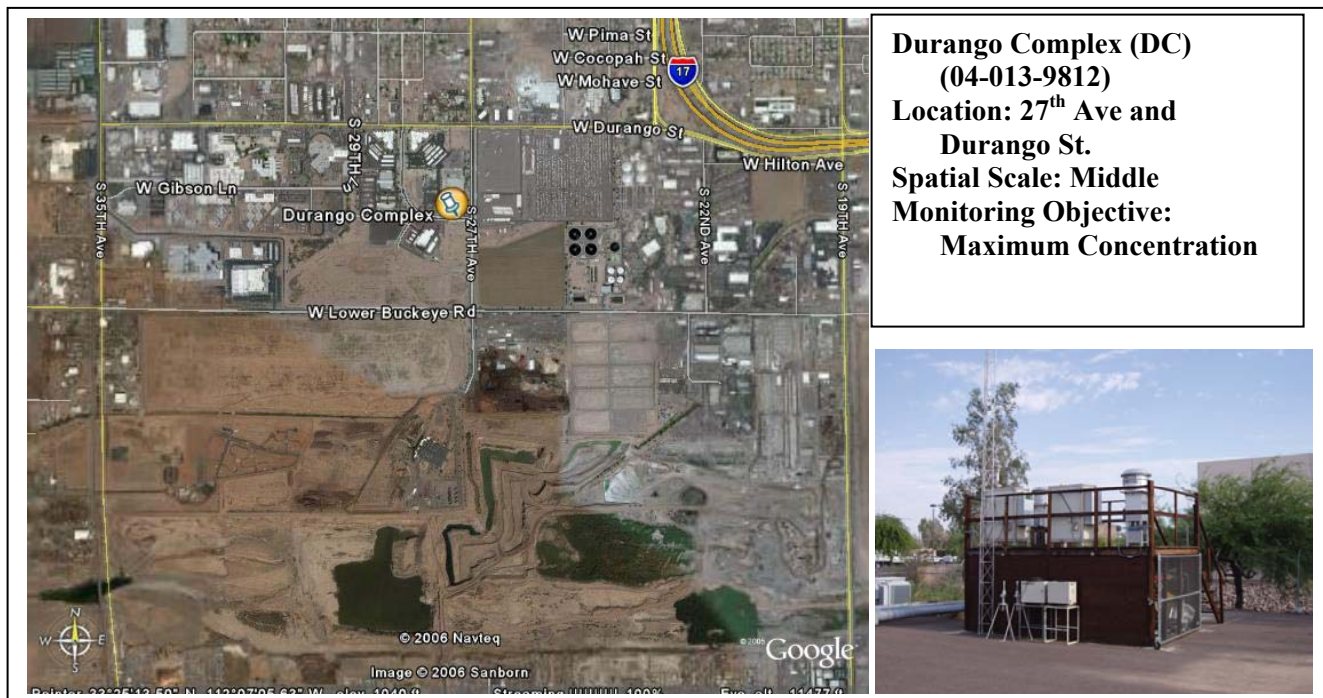


Maricopa County Chandler Air Monitoring Site

Site Description: The Chandler site is located on the property of the City of Chandler’s Wastewater Treatment Plant (CWTP). The area immediately surrounding the CWTP was a low population density area; however, it is experiencing rapid residential growth. The site is a NAMS (category b) location for PM_{10} . The site often measures a higher than expected particulate value, which has become more indicative of yard activity than reliable ambient air quality data. The City of Chandler uses the site as a storage location for street signs, water valves, and other municipal equipment, and there is considerable traffic from city vehicles. This site was closed down on December 31, 2005 at the request of the City of Chandler, which gave notice of proposed expansion plans where the platform presently stands. The Higley site, which is located approximately six miles to the east-northeast, has taken over the functions of this site.

	2003	2004	2005
Max. 24-hr PM_{10} Avg. ($\mu g/m^3$)	240*	150	130
Number exceedances 24-hr PM_{10}	1	0	0
Annual PM_{10} Avg. ($\mu g/m^3$)	50	40	49

*Indicates an exceedance of the standard.



Durango Complex (DC)
(04-013-9812)
Location: 27th Ave and
Durango St.
Spatial Scale: Middle
Monitoring Objective:
Maximum Concentration

Maricopa County Durango Complex Air Monitoring Site

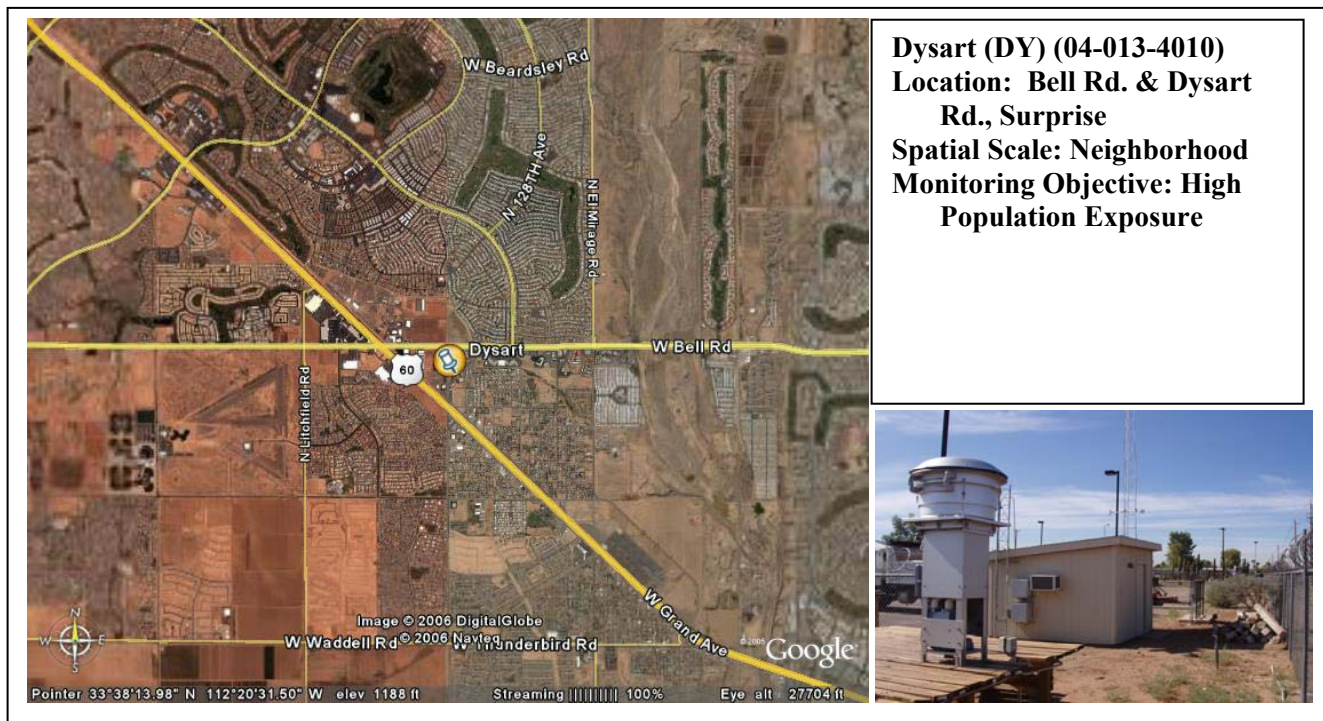
Site Description: This site is located one mile northwest from the former Salt River site in the Maricopa County Flood Control District storage yard. Sampling began on January 6, 1999 with the intent to replace the Salt River site. However, in 2000 the USEPA determined that the site is not equivalent to the Salt River site. Continuous particulate monitors (SLAMS PM₁₀ and PM_{2.5}) are located at this site. There are also weather monitors (wind speed/direction and atmospheric pressure) located at the site.

	2003	2004	2005
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	195*	209*‡	206*
Number exceedances 24-hr PM ₁₀	1	0	13
Annual PM ₁₀ Avg. (µg/m ³)	62*	52*‡	66*
Max. 24-hr PM _{2.5} Avg. (µg/m ³)	Not Monitored	Not Monitored	#
Number exceedances 24-hr PM _{2.5}	Not Monitored	Not Monitored	#
Annual PM _{2.5} Avg. (µg/m ³)	Not Monitored	Not Monitored	#

*Indicates an exceedance of the standard.

#Indicates <75% data recovery.

‡ Indicates Exceptional Events.



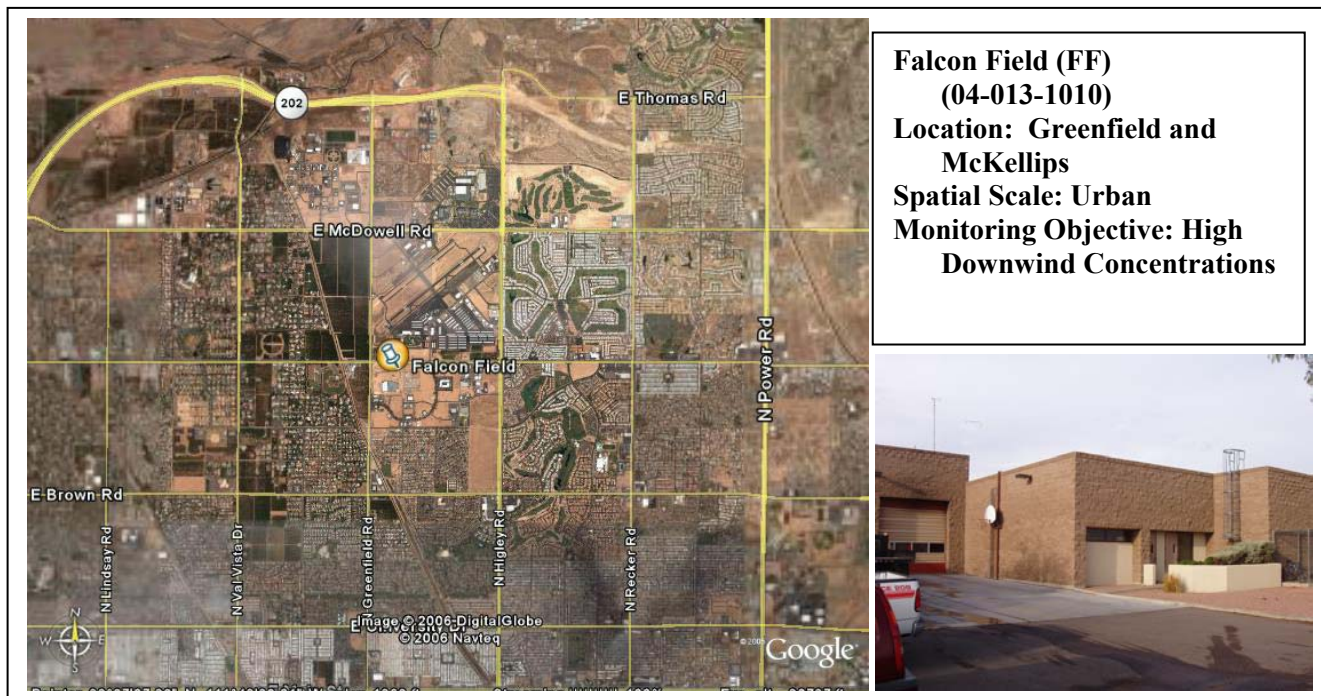
Dysart (DY) (04-013-4010)
Location: Bell Rd. & Dysart Rd., Surprise
Spatial Scale: Neighborhood
Monitoring Objective: High Population Exposure

Maricopa County Dysart Air Monitoring Site

Site Description: The Dysart site was established in July 2003. It is located at the Maricopa County Facility Maintenance Yard at the corner of Bell Rd. and Dysart Rd. The site is in a growing population area in the north-west valley. The land use around the site consists of subdivisions of single family homes, commercial, and industrial. The site is approx. one mile west of the Agua Fria riverbed. Seasonal carbon monoxide, seasonal ozone, (SLAMS) and PM₁₀ (SLAMS) are the criteria pollutants monitored at this station.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	1.2	1.1	1.3
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.090	0.081	0.082
Max. 8-hr O ₃ Avg. (PPM)	0.082	0.074	0.073
Number of Daily Exceedances >0.085 PPM	0	0	0
Three year avg. of 4 th High	#	#	#
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	133	94	76
Number exceedances 24-hr PM ₁₀	0	0	0
Annual PM ₁₀ Avg. (µg/m ³)	#	27	29

Indicates <75% data recovery rate.

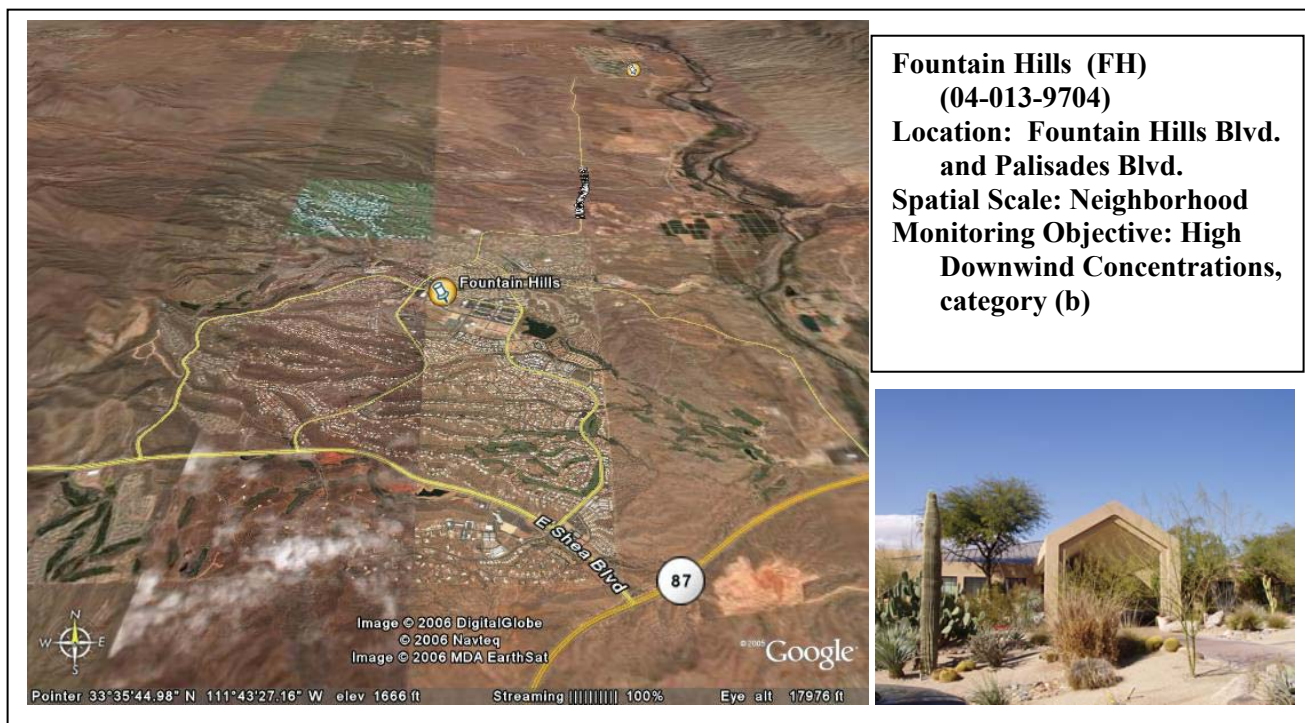


Maricopa County Falcon Field Air Monitoring Site

Site Description: Ozone is the seasonal SLAMS criteria pollutant monitored at this station. Monitoring began in June of 1989. The site is located near an airfield in a fire station within a growing residential area.

	2003	2004	2005
Max. 1-hr O ₃ Avg. (PPM)	0.111	0.093	0.104
Max. 8-hr O ₃ Avg. (PPM)	0.099*	0.077	0.081
Number of Daily Exceedances >0.085 PPM	1	0	0
Three year avg. of 4 th High	0.081	0.077	0.075

*Indicates an exceedance of the standard.

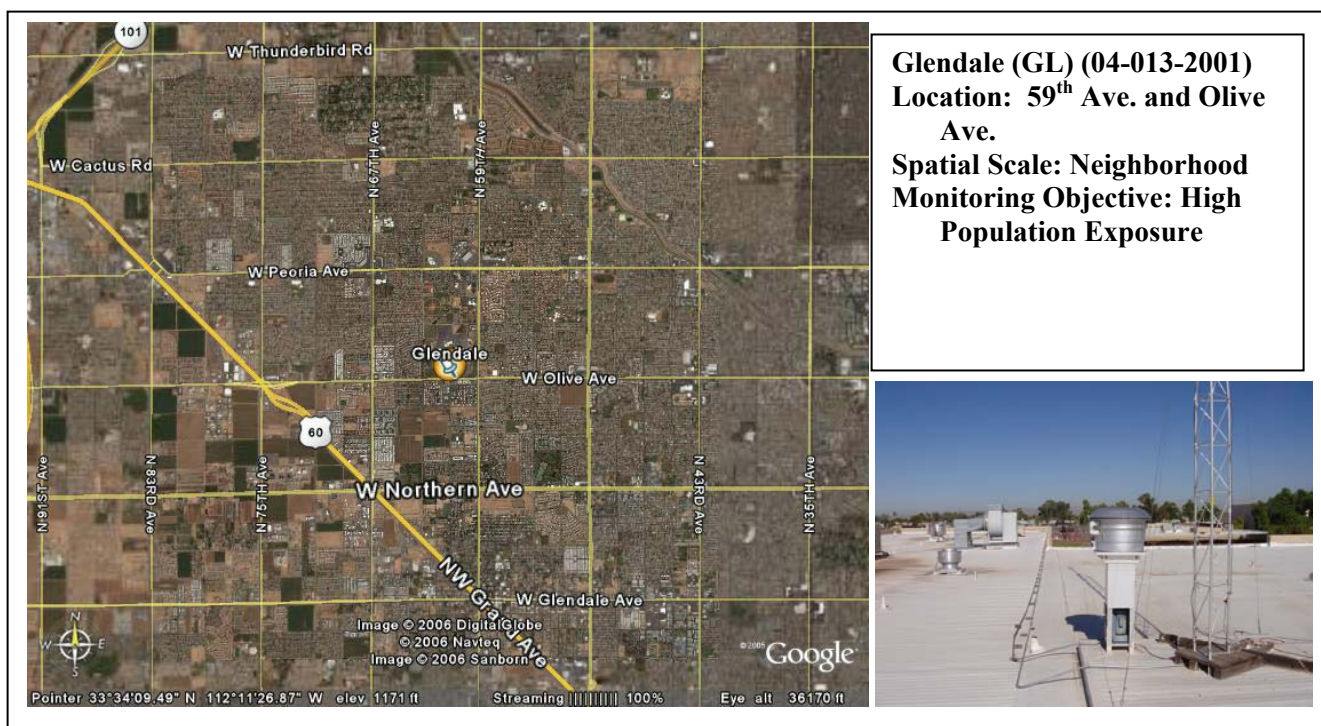


Maricopa County Fountain Hills Air Monitoring Site

Site Description: The site is located at a Fountain Hills fire station. This site became operational in April of 1996. The site monitors ozone (NAMS category b) and wind speed and direction. This site is located approximately 15 miles downwind from the Phoenix metropolitan area. This site represents the high downwind concentrations on the fringes of the central basin district along the predominant summer/fall daytime wind direction.

	2003	2004	2005
Max. 1-hr O ₃ Avg. (PPM)	0.117	0.098	0.129
Max. 8-hr O ₃ Avg. (PPM)	0.099*	0.077	0.096*
Number of Daily Exceedances >0.085 PPM	1	0	6
Three year avg. of 4 th High	0.084	0.081	0.082

* Indicates an exceedance of the standard.



Maricopa County Glendale Air Monitoring Site

Site Description: The Glendale site was established over two decades ago and is located on the grounds of Glendale Community College in a growing residential area. Homes, various strip malls, food establishments, and parks surround the site. Seasonal carbon monoxide, Seasonal Ozone, (SLAMS) and PM₁₀ (NAMS category b) are the criteria pollutants monitored at this station.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	2.4	2.4	2.4
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.107	0.100	0.096
Max. 8-hr O ₃ Avg. (PPM)	0.092*	0.082	0.078
Number of Daily Exceedances >0.085 PPM	4	0	0
Three year avg. of 4 th High	0.082	0.081	0.079
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	151	69	84
Number exceedances 24-hr PM ₁₀	0	0	0
Annual PM ₁₀ Avg. (µg/m ³)	36	26	29

*Indicates an exceedance of the standard.



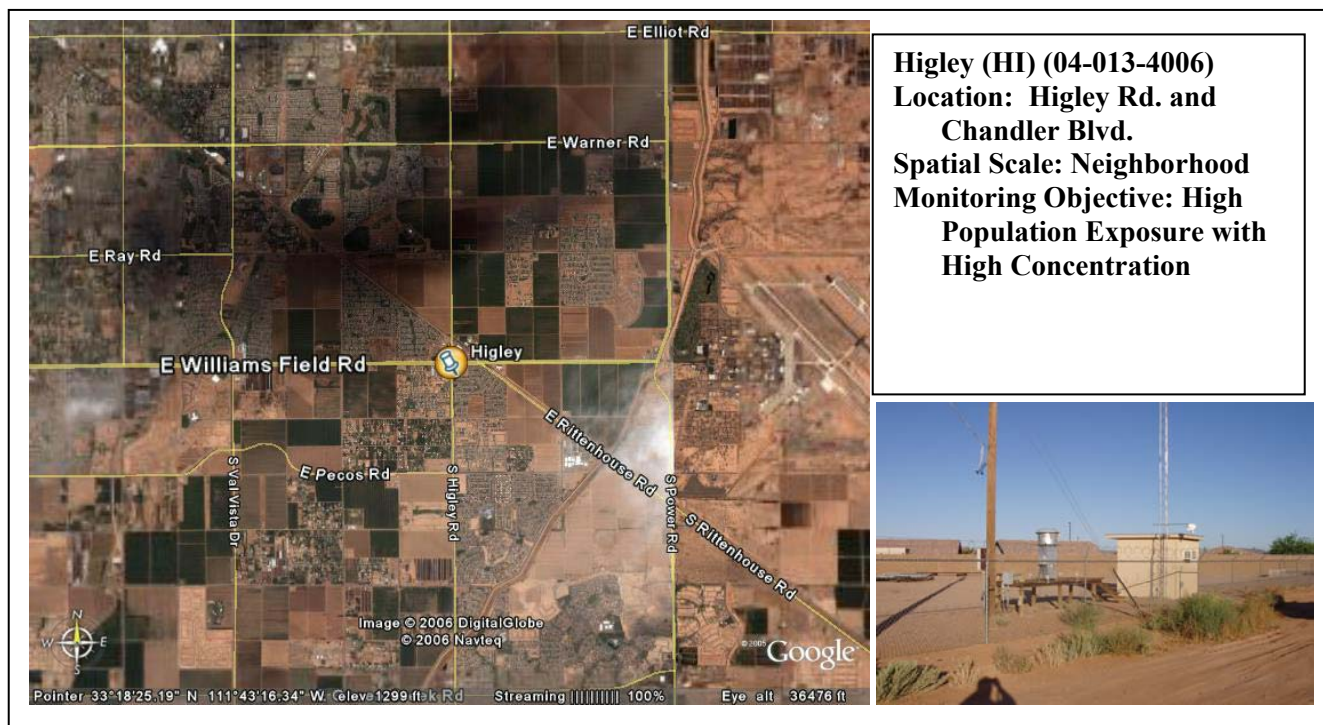
Greenwood (GR)
(04-013-3010)
Location: 27th Ave. and I-10,
Phoenix
Spatial Scale: Middle
Monitoring Objective: High
Population Exposure

Maricopa County Greenwood Air Monitoring Site

Site Description: Monitoring began at this site in December 1993. The station is bordered on the north by Interstate 10, on the west and south by neighborhood homes, and to the east by Greenwood Cemetery. Interstate 17 is approximately one mile to the east of the site. Carbon monoxide, NO₂, and PM₁₀ are the criteria pollutants monitored at this SLAMS facility. In 2005 this site used 1-in-6 day filter-based SSI monitors for PM₁₀, but these will be converted to continuous PM₁₀ monitors in 2006.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	5.4	4.9	4.2
Number exceedances 8-hr CO	0	0	0
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	166*	100	173*
Number exceedances 24-hr PM ₁₀	1	0	1
Annual PM ₁₀ Avg. (µg/m ³)	51*	44	52*
Annual NO ₂ Avg. (PPM)	0.034	0.031	0.0315

* Indicates an exceedance of the standard.



Maricopa County Higley Air Monitoring Site

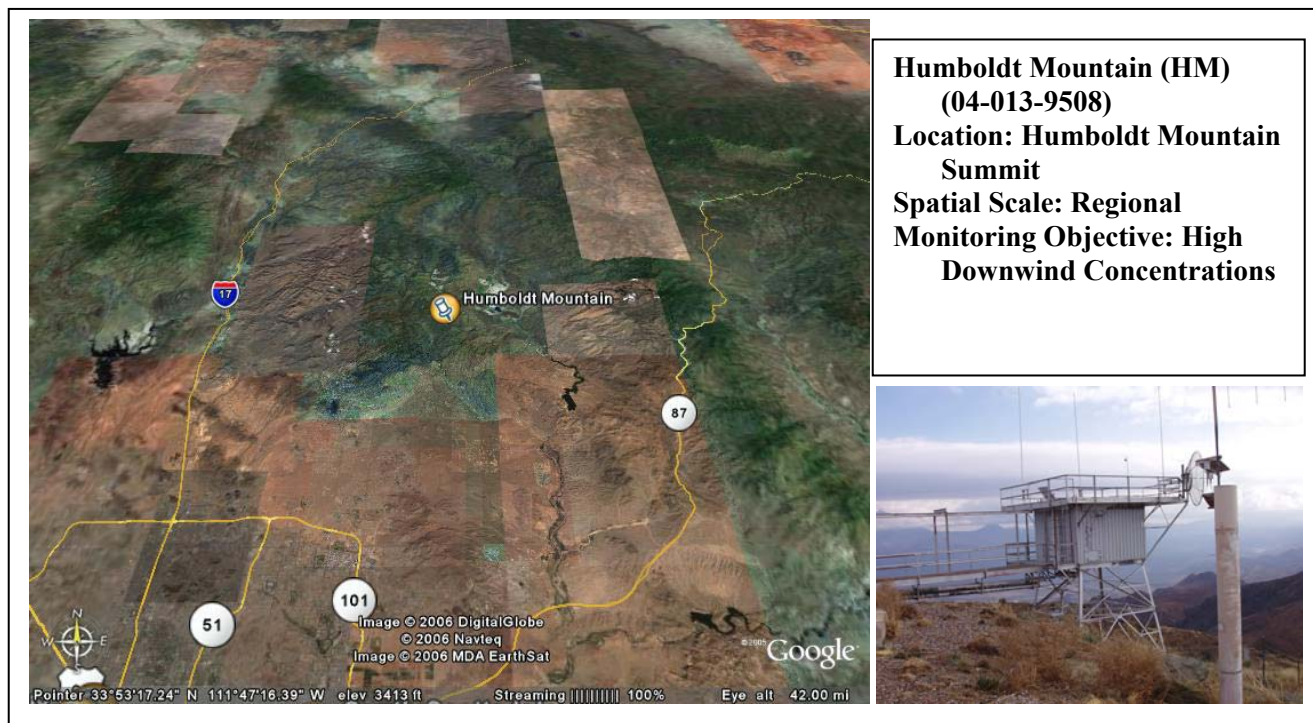
Site Description: Originally, in 1994, ADEQ set up this site to monitor for background particulate concentrations near the urban limits of Maricopa County. Since then, urban expansion has enveloped the site, so it no longer serves its original intended purpose. MCAQD installed a (1-in-6 day) PM₁₀ (SLAMS) in the second quarter of 2000. The data from this site was compared to the Chandler site and was found to be comparable. Since the City of Chandler requested that MCAQD remove the Chandler site on 12/31/05, this site has taken over the role of the Chandler site. As of October 2004 the 1-in-6 day PM₁₀ monitor was replaced with an hourly continuous PM₁₀ monitor in accordance with 40 CFR 50, Appendix K.

	2003	2004	2005
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	225*	493*‡	142
Number exceedances 24-hr PM ₁₀	1	1	0
Annual PM ₁₀ Avg. (µg/m ³)	62*	55*‡	51.4*

* Indicates an exceedance of the standard.

Indicates <75% data recovery rate.

‡ Indicates Exceptional Events



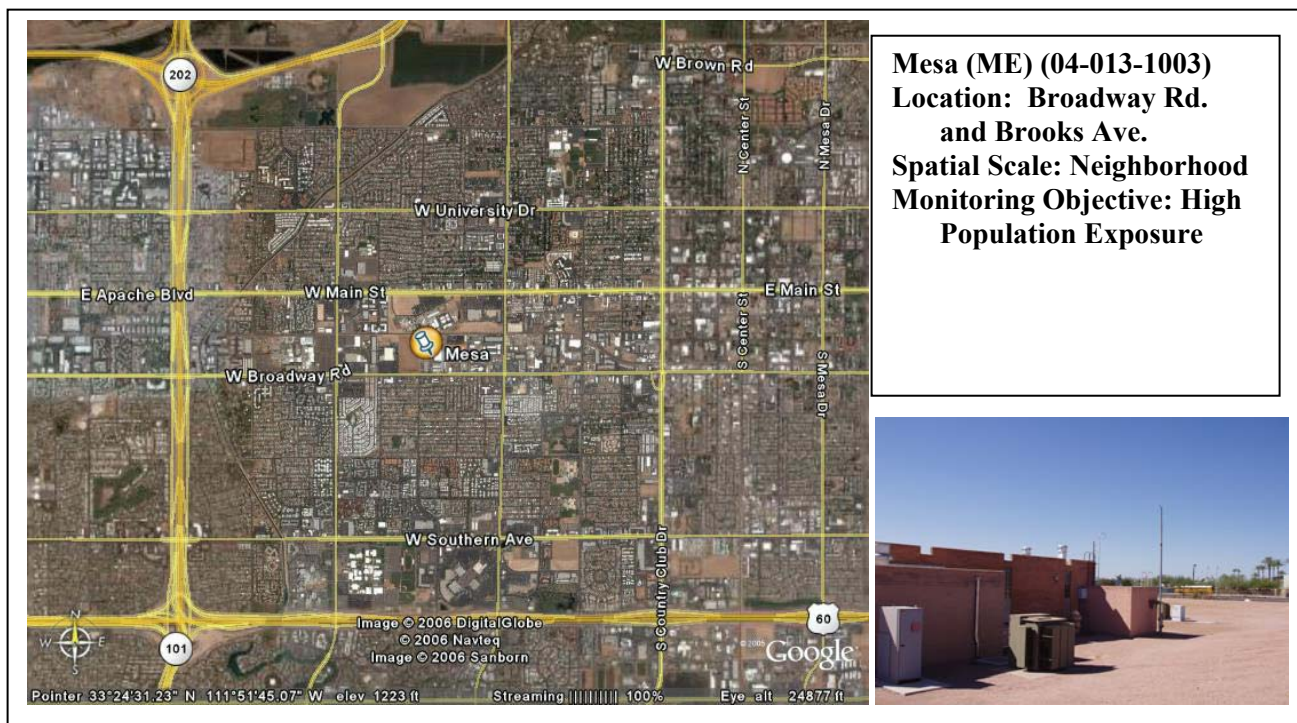
Maricopa County Humboldt Mountain Air Monitoring Site

Site Description: This site became operational in May 1996. The Humboldt Mountain site is located on Federal Aviation Agency property, in a National Forest Service building in the Tonto National Forest. This site is located approximately 40 miles north-northeast of the Phoenix metropolitan area at an elevation of 5230 feet. Ozone is the only criteria pollutant that is monitored at this seasonal SLAMS site.

	2003	2004	2005
Max. 1-hr O ₃ Avg. (PPM)	0.104	0.089	0.104
Max. 8-hr O ₃ Avg. (PPM)	0.089*	0.081	0.088*
Number of Daily Exceedances >0.085 PPM	5	0	5
Three year avg. of 4 th High	0.087†	0.085†	0.084

* Indicates an exceedance of the standard.

† Indicates a violation of the standard.



Maricopa County Mesa Air Monitoring Site

Site Description: This site is located at Brooks Reservoir at the western edge of the city near the Tempe border. It is centered in an area that contains residential, industrial, and a small amount of agricultural activity. An open field borders the site on the west with commercial development to the north, and light industry east and south of the site. Carbon monoxide, PM_{2.5}, and PM₁₀ are the criteria pollutants monitored at this SLAMS site. MCAQD started operation of the PM_{2.5} Federal Reference Method monitor in May 2005.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	2.5	1.7	2.4
Number exceedances 8-hr CO	0	0	0
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	176*	49	86
Number exceedances 24-hr PM ₁₀	1	0	0
Annual PM ₁₀ Avg. (µg/m ³)	34	23	30
Max. 24-hr PM _{2.5} Avg. (µg/m ³)	Not Operating	Not Operating	17.8
Annual PM _{2.5} Avg. (µg/m ³)	Not Operating	Not Operating	8.51#

* Indicates an exceedance of the standard.

Indicates <75% data completeness.



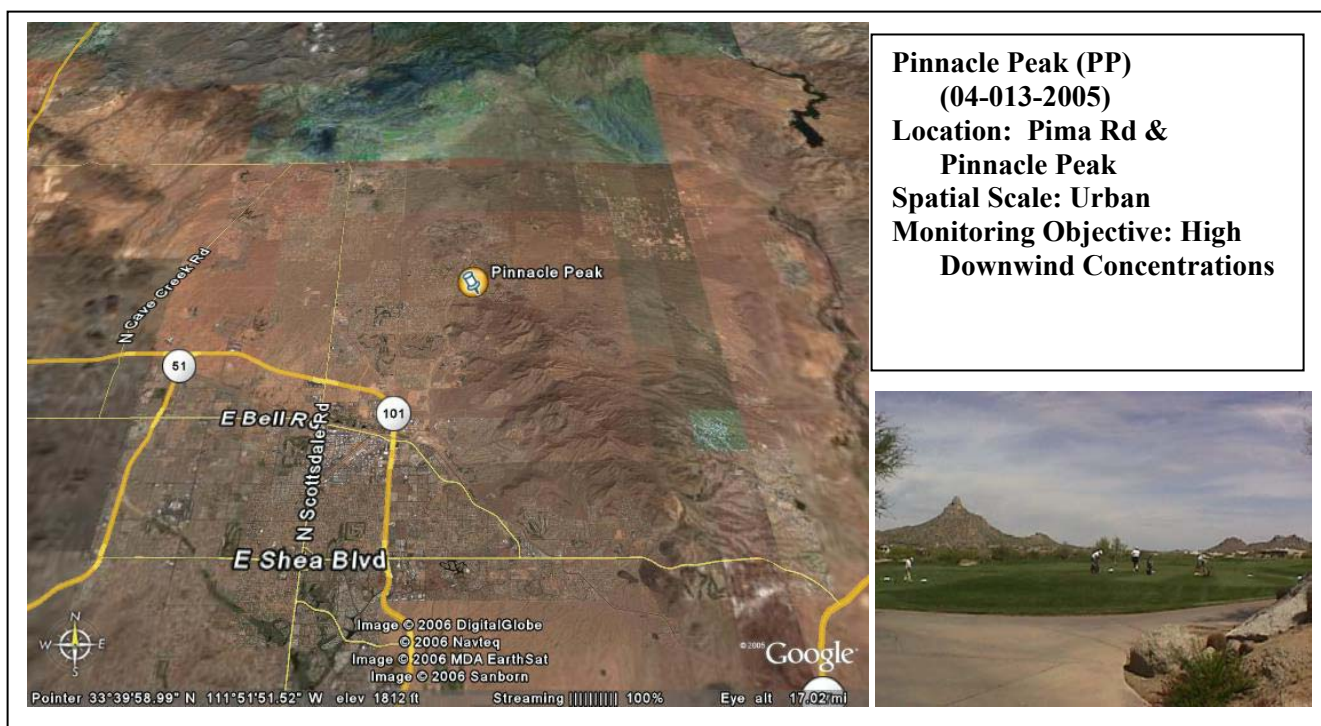
Maricopa County North Phoenix Air Monitoring Site

Site Description: This site is located in the Sunnyslope area of North Phoenix. Sunnyslope is an old established neighborhood, primarily residential. High-density population surrounds the site. CO, ozone, and PM₁₀ (SLAMS) are monitored at this site, along with temperature inversion.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	2.3	2.2	2.3
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.113	0.110	0.110
Max. 8-hr O ₃ Avg. (PPM)	0.093*	0.087*	0.089*
Number of Daily Exceedances >0.085	4	1	3
Three year Avg. of 4 th High	0.085†	0.082	0.082
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	155*	46	81
Number exceedances 24-hr PM ₁₀	1	0	0
Annual PM ₁₀ Avg. (µg/m ³)	34	25	30

* Indicates an exceedance of the standard.

† Indicates a violation of the standard.

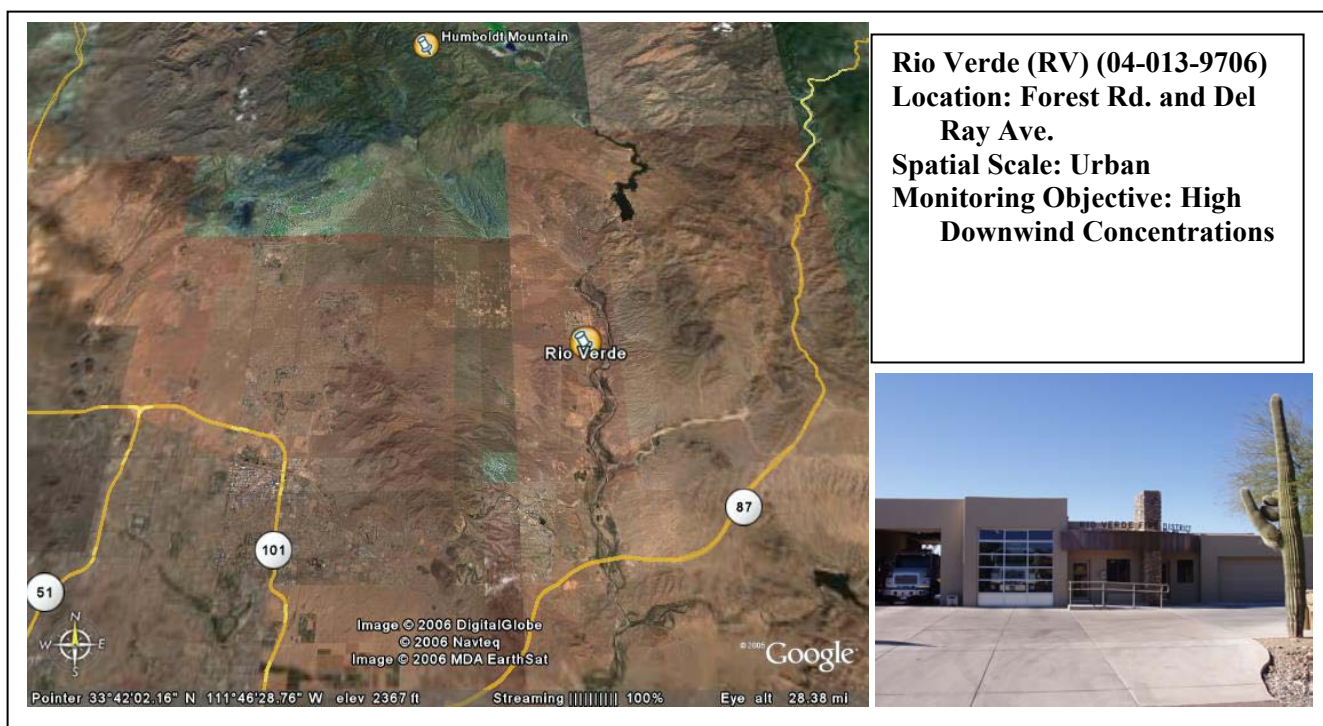


Maricopa County Pinnacle Peak Air Monitoring Site

Site Description: This SLAMS site for ozone is located at a golf course country club and is surrounded by residential homes. It is located in a geographic area of low-density population (less than 2500 people per square mile). In previous years, ozone exceedances have been recorded due to transport of ozone and precursors from more urbanized areas of metropolitan Phoenix.

	2003	2004	2005
Max. 1-hr O ₃ Avg. (PPM)	0.103	0.084	0.104
Max. 8-hr O ₃ Avg. (PPM)	0.093*	0.071	0.085*
Number of Daily Exceedances >0.085	3	0	1
Three year Avg. of 4 th High	.084	0.078	0.078

* Indicates an exceedance of the standard

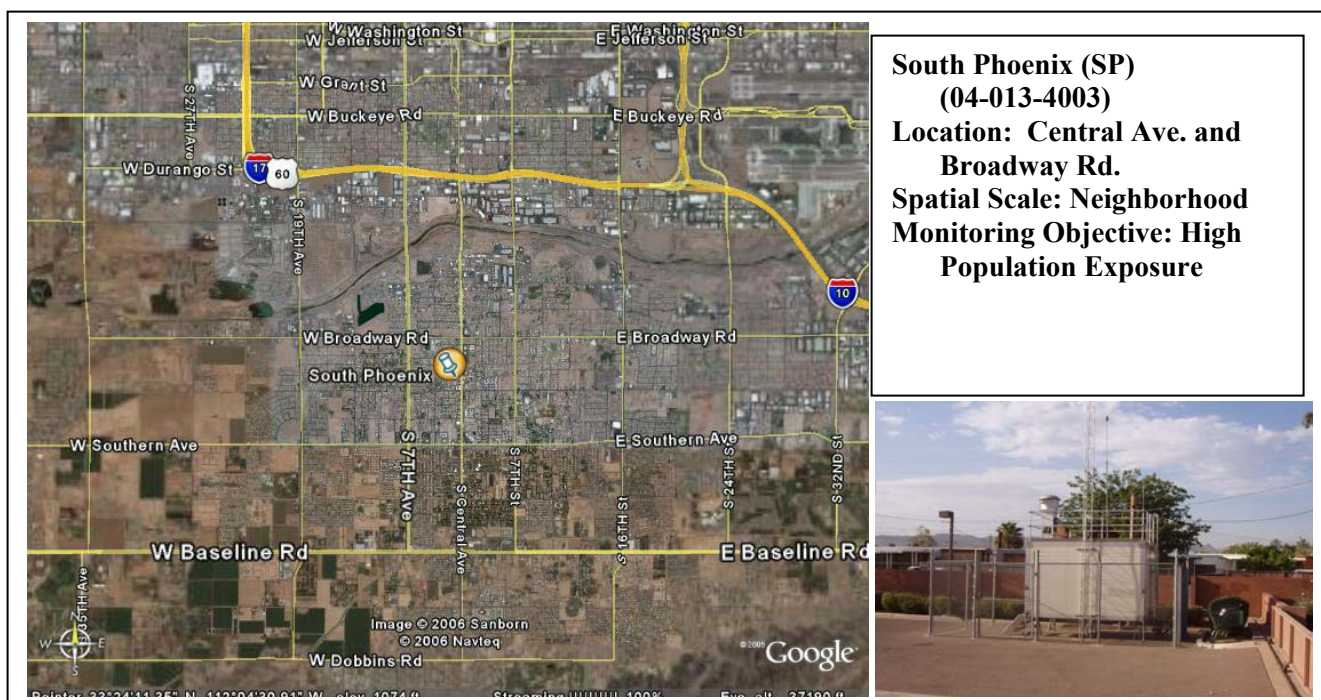


Maricopa County Rio Verde Air Monitoring Site

Site description: This seasonal ozone site became operational in spring of 1997. The monitor is located at the fire station / County Sheriff's office sub-station located in a residential area surrounded by the desert of Tonto National Forest. The site is eight miles north of the Fountain Hills NAMS station, on the edge of a Class I Wilderness Area.

	2003	2004	2005
Max. 1-hr O ₃ Avg. (PPM)	0.113	0.107	0.117
Max. 8-hr O ₃ Avg. (PPM)	0.096*	0.083	0.093*
Number of Daily Exceedances >0.085	2	0	6
Three year Avg. of 4 th High	.083	0.077	0.079

* Indicates an exceedance of the standard



South Phoenix (SP)
(04-013-4003)
Location: Central Ave. and
Broadway Rd.
Spatial Scale: Neighborhood
Monitoring Objective: High
Population Exposure

Maricopa County South Phoenix Air Monitoring Site

Site Description: The site was opened at its current location in October 1999. The site is at the edge of a high population area, but also borders on a mixture of residential and commercial (retail stores, food establishments, and office parks) land use. The station has two high population areas (>5000 people per square miles) north and west of the site. Carbon monoxide, ozone, and PM₁₀ (SLAMS) are the criteria pollutants monitored at this station. MCAQD started operation of a PM_{2.5} Federal Reference Monitor in May 2005.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	3.6	3.5	3.8
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.095	0.089	0.108
Max. 8-hr O ₃ Avg. (PPM)	0.083	0.079	0.081
Number of Daily Exceedances >0.085	0	0	0
Three year Avg. of 4 th High	0.077	0.076	0.075
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	164*	132	147
Number exceedances 24-hr PM ₁₀	1	0	0
Max. 24-hr PM _{2.5} Avg. (µg/m ³)	Not Operating	Not Operating	56.7
Annual PM _{2.5} Avg. (µg/m ³)	Not Operating	Not Operating	11.46
Annual PM ₁₀ Avg. (µg/m ³)	52*	46	55*

* Indicates an exceedance of the standard.



South Scottsdale (SS)
(04-013-3003)
Location: Thomas Rd. and
Miller Rd.
Spatial Scale: Neighborhood
Monitoring Objective: High
Population Exposure,
category (b)

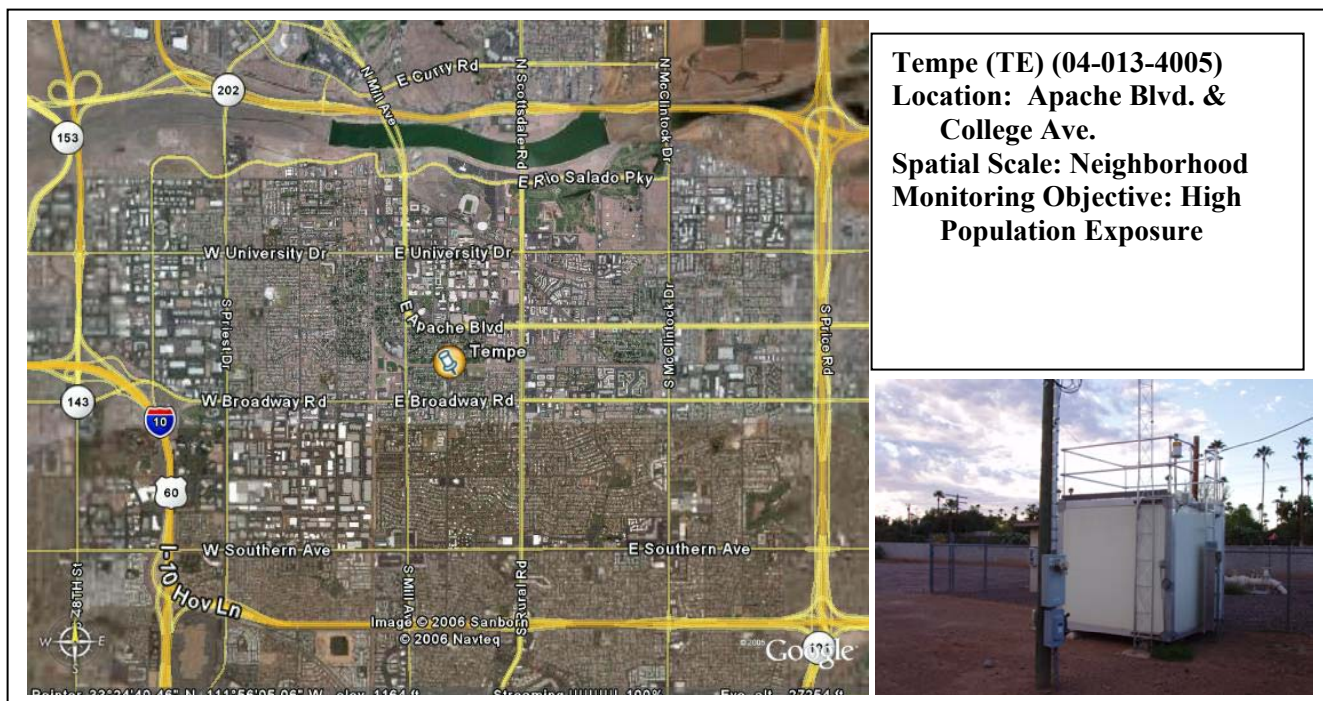
Maricopa County South Scottsdale Air Monitoring Site

Site Description: The South Scottsdale site is located at the City of Scottsdale Fire Station. The area surrounding the site is residential with a density of 2500 to 5000 persons per square mile. This site is located 12 miles east of metropolitan Central Phoenix. Carbon monoxide, (SLAMS) ozone, NO₂, SO₂, and PM₁₀ (all NAMS) are the criteria pollutants monitored at this station.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	2.3	2.4	2.4
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.107	0.091	0.117
Max. 8-hr O ₃ Avg. (PPM)	0.097*	0.081	0.089*
Number of Daily Exceedances >0.085	3	0	1
Three year Avg. of 4 th High	0.078	0.077	0.076
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	172*	77	121
Number exceedances 24-hr PM ₁₀	1	0	0
Annual PM ₁₀ Avg. (µg/m ³)	36	26	34
Annual NO ₂ Avg. (PPM)	#	0.019	0.0196
Max. 24-hr SO ₂ Avg. (PPM)	0.005	0.006	0.006
Number of Exceedances	0	0	0
Annual SO ₂ Avg. (PPM)	0.002	0.002	0.0017

* Indicates an exceedance of the standard.

Indicates <75% data recovery.



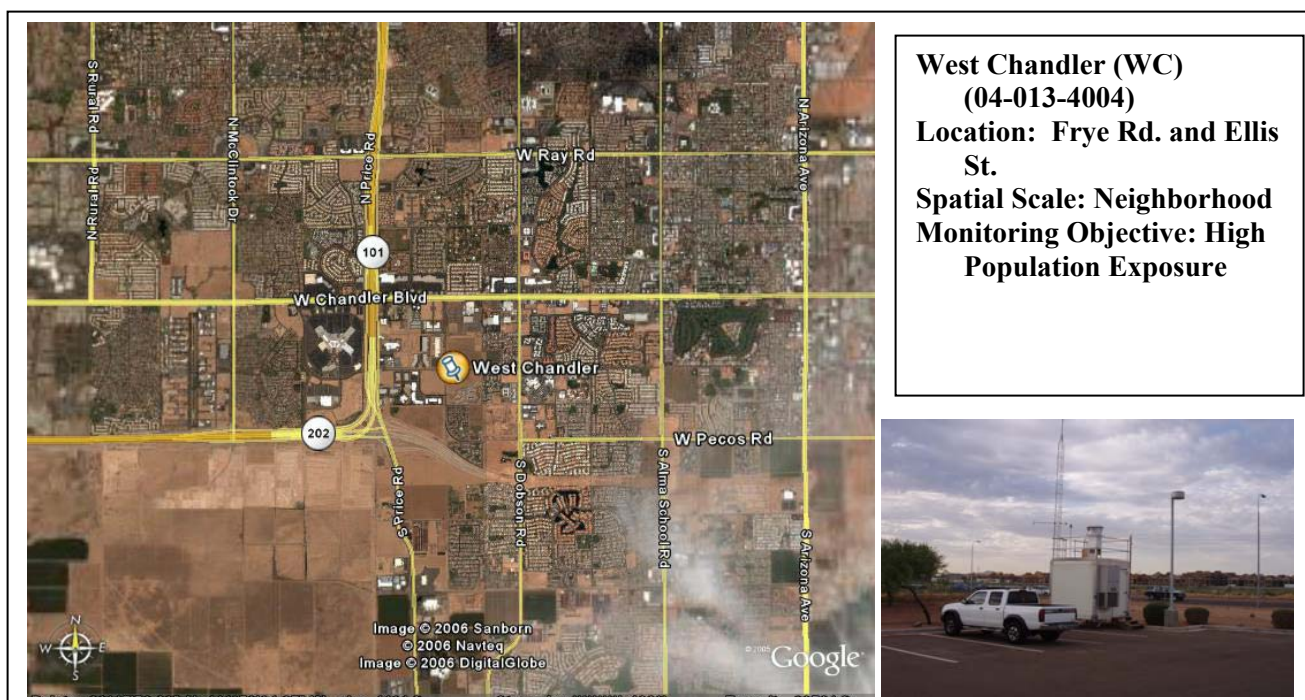
Tempe (TE) (04-013-4005)
Location: Apache Blvd. & College Ave.
Spatial Scale: Neighborhood
Monitoring Objective: High Population Exposure

Maricopa County Tempe Air Monitoring Site

Site Description: The site was established in 2000. The site was established to fill in a spatial gap between the metropolitan Phoenix area and the city of Mesa. Ozone (SPM), carbon monoxide (SPM) are monitored at the site.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	2.9	1.9	2.6
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.109	0.095	0.111
Max. 8-hr O ₃ Avg. (PPM)	0.086*	0.078	0.086*
Number of Daily Exceedances >0.085	1	0	1
Three year Avg. of 4 th High	0.079	0.077	0.076

* Indicates an exceedance of standard.



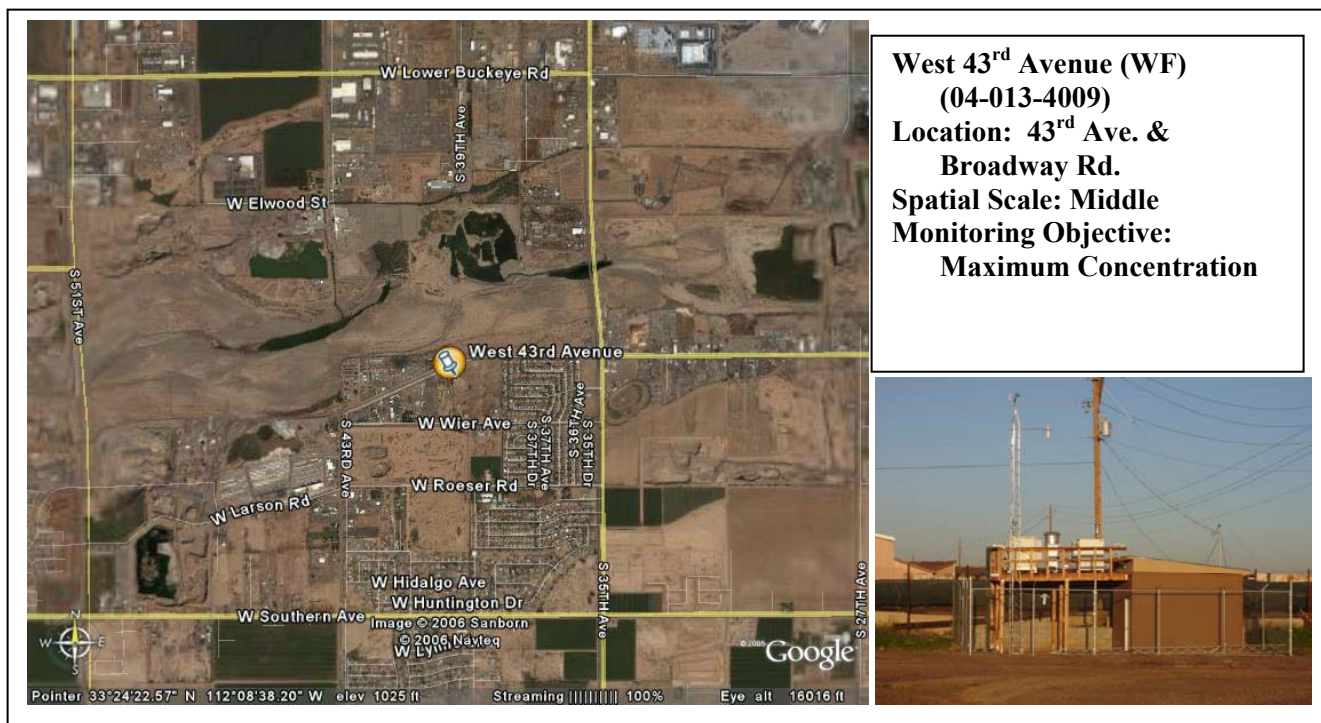
West Chandler (WC)
(04-013-4004)
Location: Frye Rd. and Ellis
St.
Spatial Scale: Neighborhood
Monitoring Objective: High
Population Exposure

Maricopa County West Chandler Air Monitoring Site

Site Description: This site was first established in January 1995. The site was moved one half mile to the southeast in May 2000. A wide range of land uses surround the site including residential, agriculture, and heavy industry (semiconductor manufacturing plants and liquid air storage). Carbon monoxide, ozone, and PM₁₀ are the criteria pollutants monitored at this SLAMS site.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	2.6	2.1	2.4
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.101	0.080	0.096
Max. 8-hr O ₃ Avg. (PPM)	0.082	0.073	0.082
Number of Daily Exceedances >0.085	0	0	0
Three year Avg. of 4 th High	0.079	0.077	0.076
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	206*	70	94
Number exceedances 24-hr PM ₁₀	2	0	0
Annual PM ₁₀ Avg. (µg/m ³)	42	30	34

* Indicates an exceedance of the standard.



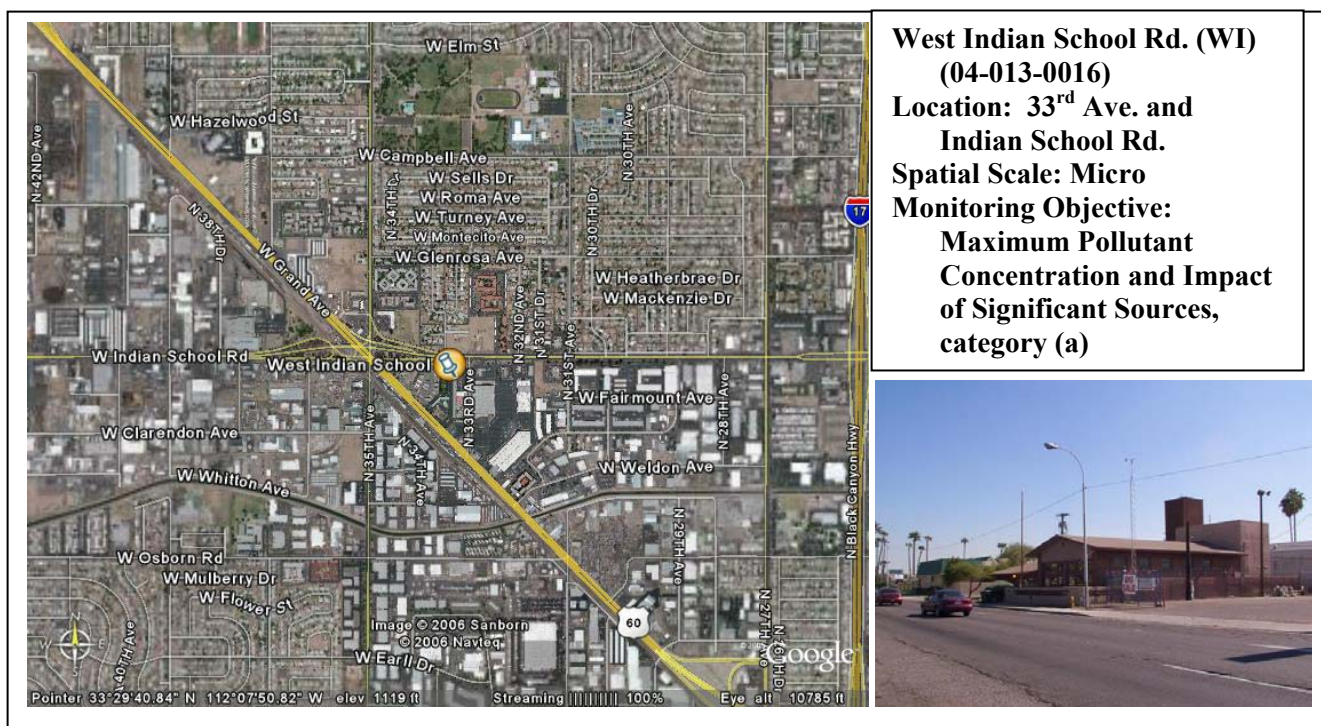
Maricopa County West 43rd Avenue Air Monitoring Site

Site Description: Monitoring began at the site in the 2nd quarter of 2002. This site is located at a Maricopa County Department of Transportation storage lot. The site is surrounded by a combination of heavy industry and residential homes. The site has one continuous TEOM PM₁₀ monitor and a temperature inversion monitor. The main purpose of the monitor is to measure maximum concentration PM₁₀ and to determine the impact on ambient pollution levels of significant sources or source categories. The sources around the site include sand and gravel operations, auto and metal recycling, landfills, paved and unpaved haul roads, and cement casting.

	2003	2004	2005
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	157*	251*‡	233*
Number exceedances 24-hr PM ₁₀	1	1	13
Annual PM ₁₀ Avg. (µg/m ³)	62*	61*‡	74*

* Indicates an exceedance of the standard.

‡ Indicates Exceptional Events



Maricopa County West Indian School Road Air Monitoring Site

Site Description: The site is located at the City of Phoenix Firefighter Training Center. This site is used to monitor micro-scale maximum concentrations and is based on high vehicular traffic. The Average Weekday Traffic (AWT) volume past this location on Indian School Road is estimated to be approximately 55,000 vehicles/day. The site is also in close proximity to Grand Ave. and 35th Ave., which have AWT volumes of about 35,000 vehicles/day. Carbon monoxide is monitored at this NAMS site.

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	5.4	4.7	5.3
Number exceedances 8-hr CO	0	0	0



Maricopa County West Phoenix Air Monitoring Site

Site Description: This site became operational in 1984. It is located about one-mile southwest of the West Indian School Road micro-scale CO monitor. The spatial scale for the West Phoenix site is neighborhood. It is located in an area of stable, high population density. Carbon monoxide (NAMS), PM₁₀ (NAMS), ozone (SLAMS), and NO₂ (SLAMS) are the criteria pollutants monitored at this site. MCAQD also operates collocated PM_{2.5} FRM monitors (SLAMS).

	2003	2004	2005
Max. 8-hr CO Avg. (PPM)	6.2	5.2	5.8
Number exceedances 8-hr CO	0	0	0
Max. 1-hr O ₃ Avg. (PPM)	0.099	0.097	0.094
Max. 8-hr O ₃ Avg. (PPM)	0.081	0.080	0.072
Number of Daily Exceedances >0.085	0	0	0
Three year Avg. of 4 th High	0.078	0.077	0.072
Max. 24-hr PM ₁₀ Avg. (µg/m ³)	158*	100	155*
Number exceedances 24-hr PM ₁₀	1	0	1
Annual PM ₁₀ Avg. (µg/m ³)	46	37	45
Max. 24-hr PM _{2.5} Avg. (µg/m ³)	Not Operating	35.2	39.2
Annual PM _{2.5} Avg. (µg/m ³)	Not Operating	11.60	11.08
Annual NO ₂ Avg. (PPM)	#	0.024	0.0235

* Indicates an exceedance of the standard.

Indicates <75% data available.